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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A New Figure

THE annual meeting this year at Edinburgh of the Society of Chemical Industry will be remembered, among many other things, for its introduction of a new figure in chemical industry in the person of the Society's Lecturer for the year. Colonel G. P. Pollitt is not really new to chemical industry; he has been very deeply engaged in it for the past few years, as his review of the synthetic nitrogen industry in this country conclusively showed. Yet, so far as we can recall, he had never made a public appearance at any previous annual meeting; he had never lectured before any of the chemical conferences; he was not familiar as a writer on chemical subjects; nor had he taken much, if any, part in ceremonial or social functions associated with the industry. He made his entry at one stride at Edinburgh. His success was immediate. It is inconceivable that he should be allowed to return to seclusion. It is a fair penalty that he should have to let us see and hear a little more of him in future.

Two features, in particular, distinguished the lecture. The first was the singular interest of its presentation. A lecture on "The Development of the Synthetic Nitrogen Industry in Great Britain" might have become, in the wrong hands, a masterpiece of dullness —a veritable quagmire of technicalities, out of which no definite conclusions or meanings could be recovered. In Colonel Pollitt's it proved one of the brightest, most informing, most arresting narratives to which we have listened. There was no oratory in it, no epigrams, no studied effects of any kind; its style was athletically spare. Concerned with a highly technical subject, it was simplicity itself. The Lecturer did not even adhere to the phraseology of his text. He turned it into a talk as he went along, missing, however, no single point in the process, merely adding here and there a few words that told one a little more. His audience, filling the lecture room, and occupying seats that required an almost Socratic indifference to physical discomfort, listened without a break until the end. Then, in a spontaneous outburst of applause, they expressed their sense of a story of great scientific achievement perfectly told. In less than an hour the whole meaning of "Billingham" had been made clear. The lecture itself seemed as workmanlike a job as the great project it described, and gave, indeed, some clue to the secret of its success.

If the presentation of the matter was interesting, the matter itself was no less important. Very early in the lecture it became clear what a highly experimental project Billingham was when Brunner, Mond and Co. took it over. At the end it was equally clear what a success they had made of it. It was to a large extent a chemical engineering problem. At the outset it was impossible to obtain the valves, joints, etc., required for high pressure processes; they were not being made in this country. So the company's engineers set about making their own, and did it so well that their high pressure apparatus to-day is simpler to operate and easier to maintain than ordinary low pressure plant. Quantitative measurements, again, of the most exact kind had to be introduced on a very extensive scale. Here, again, the company undertook the design and manufacture of their own instruments, with the result that they have now a highly developed system which not only indicates the physical conditions of gases, liquids, and solids, but to a large extent supplies automatic controls in place of unskilled labour. The initial difficulties, therefore, which confronted the enterprise have turned out very much to its ultimate advantage. They compelled the company to trust to their own resources, and to supply all their own needs. The result to-day is a plant and organisation every bit of which has been designed for its own purpose, which has been entirely created and developed from within, and which is therefore completely understood by those responsible for it. The personnel has been built up in much the same way. The research chemists, the works managers, the engineers spend periods in one another's departments, and in that way acquire the central point of view instead of the detached outlook that

results from working in isolation. Thus one vast completely unified machine has come into existence.

The results already obtained are remarkable, but hardly any limit can be set to the possible developments. From the national point of view the first result is to render this country independent of imported nitrogen supplies; Colonel Pollitt already foresees a stage when the importation of Chile nitrate may cease to be economic. The discovery, again, under the Billingham site of large deposits of anhydrite, which supplies the sulphate radicle in the place of sulphuric acid, not only cheapens production but makes the company independent of imported sulphur and sulphur compounds. The deposits are so large that ultimately the country generally may become independent of sulphur imports. These are very large results for the nation, quite apart from their importance to the company.

As regards actual products, the principal one is still ammonium sulphate, but other products include nitric acid, ammonium nitrate, anhydrous ammonia, ammonium carbonate and nitro-chalk, and provision is being made for converting the ammonia into ammonium phosphate and various forms of compound fertilisers. In this field to-day this country is second only to Germany. But beyond this the Billingham enterprise is engaged in work designed to make this country independent of imported natural oils. The future programme includes the hydrogenation of coal, the manufacture of methanol from water gas, proceeding possibly up to the higher alcohols, and the conversion of methane, obtained by the distillation of coal, into acetylene.

These are amazing results to have been achieved within the space of a few years. Colonel Pollitt has done a service in making them known to the industry. They deserve, however, to be made known nationally and even internationally as an antidote to pessimism and as a proof of what this country can do under real scientific leadership and control.

Intensive Production of Sulphuric Acid

SOME effort has been made in the past to keep our readers informed of the developments which have taken place in plant for the more intensive production of sulphuric acid. An interesting article appeared in our issue of February 7, 1925, on this subject. This was followed by a no less notable contribution by Mr. P. Parrish in our issue of December 11, 1926. The last-named article referred largely to the application of the Gaillard turbo-disperser system to existing sulphuric acid plants, irrespective of shape or dimensions; it enlarged upon the growing appreciation of the importance of the liquid phase as the essential factor in sulphuric acid production, and it furnished working results which could not prove other than of interest to acid manufacturers in this country.

Unsolicited confirmation of the importance of the liquid phase in the production of vitriol is now forthcoming from a source which will command universal respect. In the 63rd Annual Report, just issued, on alkali, etc., works, Dr. T. Lewis Bailey, the chief inspector, on page 6 of his report, makes the following significant observation :—

> In last year's report, p. 8, after a consideration of various points in connection with the lead chamber reactions, with special reference to nitre consumption, attention was drawn to the possible conditions existing in the neighbourhood of steam jets and water sprays. In this connection it is of particular interest to be able to record the experience of Dr. J. Fischler, Trzebina, Poland, who has given his experience of the use of acid sprays instead of water sprays over a period of three years (*Zeits. f. angew. Chemie*, **39**, 55, January 14, 1926). He says the change has brought with it not only advantage as regards average concentration of the acid formed, but in addition the average nitre consumption has fallen considerably, notwithstanding the increased output per unit of chamber space.

The production at many sulphuric acid plants on the Continent has been increased by 30 to 40 per cent., at apparently little expense, by the adoption of the Gaillard system. Atomisation of the acid can be effected at reasonable cost as regards power and pumping, and provided denitrated acid of about 78 per cent. strength is used, corrosion does not occur. No increase in the consumption of nitrate of soda or nitric acid need arise if the plant is judiciously operated and certain conditions observed. Indeed, as Dr. J. Fischler, of Poland, points out, the use of acid sprays as distinct from water sprays should contribute to a reduction of the nitrate of soda or nitric acid consumption.

Advantageous as are the results which follow the use of atomised denitrated sulphuric acid, it has recently been demonstrated that the employment of nitrous vitriol in atomised form materially increases the production of sulphuric acid per unit of chamber space. The space-time factor is reduced to an incredibly low limit—about 1 to 1½ cubic ft. of chamber space per lb. of sulphur per 24 hours—and the flexibility of operation is increased. It will, however, be appreciated that nitrous vitriol cannot be atomised within a chamber without affecting the lead. This disability is overcome by protecting the lead walls with suitable tongued and grooved tiles made of acid-resisting material. It becomes increasingly evident that the Gaillard system is not a passing phase in the technique of sulphuric acid production, but that it concerns a fundamental principle, the adoption of which is long overdue.

Coal Cleaning Problems

THE conference on "Coal Cleaning" at Edinburgh last week had the advantage of drawing together three groups immediately interested in the problem—the Fuel Section of the Society of Chemical Industry, the Institution of Gas Engineers, and the Coke Oven Managers' Association. It brought to a focus the views of research chemists, engineers, and others concerned with the carbonisation of coal. The result was to show what a medley the present conditions constitute, and the small extent to which any science or system enters into the existing methods of preparing coal for the market and of actually selling or buying it. Even the humble domestic consumer, buying coal by the cwt. or the ton at a pretty stiff price, is morally entitled to some assurance that he is really getting what he pays for, as he does when he purchases his margarine or chilled beef. If the stuff proves more akin to the product of the slate quarry than to that of the coal mine, nothing more than domestic annoyance and grievance results. But in the case of coal car-

bonisation concerns, which buy and carbonise enormous quantities, even slight variations of quality or marketing condition or size, to say nothing of chemical constitution, may produce almost ruinous differences in working and production.

It is a fair claim, on the part of these large interests, that the seller of coal should know something of what he is selling them, and should be obliged to give some sort of guarantee to the purchaser. Yet the discussion showed an almost total lack of this provision. In these circumstances, it was a distinct gain to be able to agree on a starting point towards a better order of things. This took the form of a decision to approach the British Engineering Standards Association, which has already done some excellent work, to prepare a standard nomenclature of coal sizes, so that such terms as "cobbles" and "smalls" may mean something approximately uniform to all buyers. When the industry has accepted a set of standard definitions for the regulation of buying and selling, there will be some basis on which to begin to construct a systematised commercial practice.

A New Terror to Chemists

RECENT events in the United States point once more to the fact that we are a backward race. This reflection arises out of an account (published, we hasten to add, in an American chemical journal) of an attempted burglary at the Abbott Laboratories, Chicago. The American burglar is no longer a beetle-browed roughneck; on the contrary, he seems to have been taking an interest in the Higher Thought. Cash and negotiable securities have lost their appeal; gold and jewels leave him cold. The officials of the Abbott Laboratories and the American police are both of the opinion that "secret formulæ, including one of a synthetic non-habit-forming narcotic of reputed pain-killing potency, may have been the lure which drew eight masked robbers carrying machine guns and revolvers." Our British Bill Sikes does not seem to have explored this line of thought. During the Edinburgh meeting, no effort was made to waylay Mr. F. H. Carr in one of the numerous "closes" or "wynds" in order to relieve him of the formula of ethyl acetate. Even Dr. Armstrong, who has, we believe, some inside information about the formula of benzeneazo-β-naphthol, is able to go about without an armed guard.

All this adds one more to the charges of lack of enterprise which have, justly or unjustly, been made against us by our American brethren. The saddest thought of all is that the present charge is retrospective. At one time and another quite a number of formulæ have been discovered by British chemists. No effort seems to have been made by the British criminal class to deal adequately with these chemists; on the contrary, they have been allowed to publish their results and thereafter to die peacefully in their beds. Here, surely, is yet another instance of the grave errors into which those ignorant of chemistry may fall. There is, however, another possibility. Can it be that the British burglar is *more* cultured than his American friends? That he has taken a course of evening classes in chemistry? And that he has discovered that he can, without murder or burglary, satisfy his craving for formulæ simply by looking them up in Beilstein?

Improving Overseas Trade

THE signs of improvement in chemical overseas trade disclosed in the Board of Trade figures for May are more than maintained by the returns for June. For the first time since the dislocation of last year we have had one month of all-round advance. The imports, which had naturally been swollen by the scarcity of home supplies, especially of raw materials, now show a substantial decline on the corresponding months both of 1926 and 1925. The exports are £91,978 better than in 1926 and £35,579 better than in 1925. The re-exports, which are some guide to merchanting activities, have increased by £11,126 and £34,102 compared respectively with 1926 and 1925. These figures confirm the growing conviction that a steady improvement in chemical trade is setting in.

The decline in the imports, satisfactory as it is, would have looked even better if it had been more evenly spread over the products. It is largely explained by a few large decreases; for example, nickel oxide has declined from £25,300 to nil, coal tar products from £137,762 to £99,309, drugs, etc., from £281,314 to £153,500, and intermediates from £1,204 in 1925 to nil. On the other hand, there are unpleasantly large increases in acetic acid, borax, sodium nitrate and other compounds, while the imports of alizarine are maintained at £5,050, and the imports of other dyestuffs have actually advanced from £40,312 in 1925 and £54,718 in 1926, to £80,000 for the past month. The last item is a little disturbing.

The export figures, again, are not as consistently good as could be wished, though the total increase is satisfactory. The most notable increase is in sulphate of ammonia, which has advanced from £240,321 in 1925 and £138,035 in 1926 to £350,953, thus completely wiping off the recent decreases. On the other hand, coal tar products exports, which in June of last year stood at £247,823, have declined to £175,776, a little below the 1925 figure. Both potassium and sodium compounds have recovered to about the standard of 1925, but there is a heavy drop in drugs, etc. The decline in dyestuff exports corresponds closely with the increase in dyestuff imports, and the two sets of figures need to be studied together.

Books Received

MODERN WATERWORKS PRACTICE. By F. Johnstone Taylor. London: Ernest Benn, Ltd. Pp. 270. 18s.

TITANIUM. By William M. Thornton. New York: The Chemical Catalog Co., Inc. Pp. 262. $5.00.

REPORT OF THE FUEL RESEARCH BOARD FOR THE YEAR 1926. The Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 62. 1s. 3d.

The Calendar

July 18–23	Advertising Convention and Exhibition.	Olympia, London.
22	Institution of the Rubber Industry: Education Committee Meeting, 4.30 p.m.	10, Charing Cross Road, London, W.C.
Aug. 31–Sep. 7	British Association for the Advancement of Science: Annual Meeting.	Leeds.

Society of Chemical Industry Annual Meeting

Closing Impressions of Edinburgh

Edinburgh, Friday, July 8.

WITH the visit to the refinery of Scottish Oils, Ltd., Grangemouth, to-day, the industrial features of the 1927 meeting came to an end, and to-morrow, like to-day, will be given up to excursions of one kind or another. While the meetings, as previously indicated, began on a rather quiet note, the interest steadily developed throughout the week, and the more the members were together the happier they seemed to be.

The great day of the week was Thursday. The programme began with the lecture by the Society's Medallist, Colonel Pollitt, on "The development of the synthetic nitrogen industry in Great Britain." This was delivered in the Medical Chemistry Classroom of the University before a large and keenly interested audience. The subject and the subject-matter were enough in themselves to arrest attention, but the Lecturer's personality, and his easy familiar style completed the success. In the simplest possible terms, and with many a passing joke and "aside," Colonel Pollitt sketched in outline the history of the Billingham undertaking, indicating the difficulties that had had to be faced and the way in which they had been overcome. And when he announced, as his final conclusion, that the nitrogen problem in this country had been technically solved and that, always excepting Germany, this country was now ahead of any country or group of countries, not excluding the United States, there was a spontaneous outburst of applause. When he sat down, he got what may properly be described as an ovation. The lecture was an admirable example of the right way to state a case—nothing essential to the story was omitted, nothing not directly material was included. It could all have been followed by an intelligent schoolboy, so simple did the Lecturer make the subject seem.

Not the least interesting feature was the slides. These began—with a touch of real humour—with the village church and the view from the tower! How many scientific lecturers would have thought of that as a starting-point? We were shown the water gas building, the electrical transformer house, the ammonia building, several glimpses of the plant, the sulphate of ammonia silo, and lastly the new works in process of construction—in some ways the most impressive of the series as showing the immense programme in contemplation. The views gave some idea of the mechanical handling equipment. Nothing, we understand, is bagged for shipment until the vessel or train is ready to receive the consignment. Then the sulphate is drawn from the heap by suction tubes, deposited in the bags, the weight being automatically determined within a fraction, and the bags go straight to the receptacle. Incidentally, Colonel Pollitt mentioned the difficulty at first experienced in producing white sulphate. This was got over entirely by the use of non-corrodible steels.

The lecture was full of points and as it is printed elsewhere only a few need be noted here. One was the statement that in establishing the high pressure industry it was found impossible to obtain from existing engineering firms the type of valve, joints, etc., required. The Billingham engineers had to provide all these requirements themselves, and so satisfactorily has this been done that their high pressure apparatus is in many respects simpler to operate and easier to maintain than low pressure plant. The fact, again, that no real help could be obtained from other sources forced the company to develop their own system throughout, and the exact information thus gained has more than outweighed the disadvantages of starting without experience. Another point of interest was the discovery below the Billingham site of immense deposits of anhydrite—apparently a pure piece of luck of which the company has taken full advantage. From this, instead of from sulphuric acid, is obtained the sulphate radicle, and as the supplies are almost without limit the works are independent of imported sulphur or sulphur compounds, and it was even intimated that this country might itself become similarly independent owing to the Billingham supplies. Finally we had a glimpse of developments far beyond the production of compound fertilisers and even urea, such as the manufacture of methanol from water gas, leading up ultimately to the higher alcohols, the conversion of methane into acetylene, and the hydrogenation of coal, as regards which Colonel Pollitt hoped they might soon be doing something on a respectable scale.

Immediately after this lecture came the conference on "Coal Cleaning," which began half-way through the morning and continued well into the afternoon. This brought together a strong gathering of coal experts, chemical engineers, and gasworks engineers, several of whom had been unable to reach Edinburgh before and who left afterwards. It was appropriately presided over by Dr. Lander, of the Fuel Research Station, and papers were read and part taken in the discussion by many of our recognised coal experts. What stood out through the discussion was the conviction that the present unscientific methods of handling coal must be replaced by something better, and that coal must be treated as a chemical substance from which the full value must be obtained. Here, again, the discussions were of a very practical character, and the interest was maintained at a high level throughout.

On Wednesday morning at the joint meeting with the Bio-chemical Society, the subject for discussion was "The physiological and industrial aspects of the chemistry of carbohydrates." Professor Barger, to whose work Mr. Carr had already paid a tribute in his presidential address, presided, and there were contributions from Professor W. N. Haworth, Professor Ling, Mr. C. G. Lambie, and Dr. C. J. Fox and L. Hall. The discussion at times was of a highly academic character, but the rather moderate audience was clearly interested. Simultaneously there was a meeting of the Chemical Engineering Group, over which Mr. F. H. Rogers presided, and at which Dr. Macdonald presented a paper on "Some aspects of the manufacture of fibrous cellulose," followed by a film illustrating the production of Esparto paper from the raw material to the finished product. In the afternoon there was a lecture by Professor J. Read on "Natural sources of energy in Australia."

The visits to works are always a feature of these annual meetings, and the opportunities arranged this year by the local committee were fully appreciated. The first of these visits was to the Edinburgh Corporation Gasworks, at Granton, a modern installation that illustrates how clean and orderly a process coal carbonisation may become when rightly planned. A welcome was extended to the guests by Judge Harvey and was acknowledged by Dr.

Smith (of the Woodall-Duckham Co.), the new treasurer of the Society. On Thursday, in spite of the dreadful weather, parties were taken over the paper mills of James Brown and Co. at Penicuik, and the Castle Mills of the North British Rubber Co., and had the various processes explained to them. On Friday, the refinery of Scottish Oils, Ltd., at Grangemouth, was visited. The guests in every case were most hospitably received, and were obviously much interested in the technical and engineering equipment.

Of the purely social gatherings much could be written, but it must suffice to mention them briefly. The Lord Provost's welcome was more than a ceremony; there was a personal note in it that added to its value. At the official reception in the City Chambers, he not only gave us a cordial little speech, to which Mr. Carr responded, but remained throughout the greater part of the evening, with a number of other councillors. Another very pleasant function was the reception by the University in the beautiful Upper Library Hall of the old University buildings. Here the guests were welcomed by Professor Baldwin Brown, the senior professor, who told us in a little lecture on the architectural and geological characteristics of the city, much that does not appear in the guide books. The luncheons and the annual dinner were the usual jolly gatherings that one expects, and the dances that followed the President's reception and the annual dinner, finally dispelled the tradition that chemists are unsociable people, with an objection to late hours. The conducted tours of old Edinburgh, including, of course, the "Royal Mile," which were in charge of members of the old Edinburgh Club, attracted many members and were admirably managed, while some of those who went exploring on their own found themselves listening to a famous libel action before Lord Murray, or explaining their misdemeanour in driving to a good-natured sentry at Holyrood. The excursions to Melrose, to the Forth Bridge, to St. Andrews and to the Gleneagles Golf Course, were lucky enough to get good weather in a rather broken week.

By the end of the week Mr. Carr must have been thankful for a rest. Apart from his presidential address, into which much work had been put, he was present at every function, either presiding and directing operations or replying to welcomes on behalf of the Society or otherwise making some contribution to the total effect. The quiet dignity and obvious sincerity with which all his duties were discharged left their impression everywhere, and created an atmosphere of respect both for himself and for his office. He was well supported by the officers of the Society, and the members of the local Section worked unsparingly throughout the week to secure the convenience and comfort of all the visitors.

Development of the Synthetic Nitrogen Industry

By Lieut.-Colonel G. P. Pollitt, D.S.O.

We give below the text of the lecture delivered by the Society's Medallist (Lieut.-Colonel Pollitt) at Edinburgh on Thursday, July 7, on "The development of the synthetic nitrogen industry in Great Britain."

Production and Consumption

I DO not propose to go deeply into the statistical position of the world's nitrogen production and consumption, but it may be worth while to recapitulate a few important figures so that the magnitude of the question involved may be present in your minds. For the year 1926, the last year for which complete figures are available, consumption had reached 1,250,000 tons 100 per cent. nitrogen. They show a greatly accelerated production of fixed nitrogen during the war years, followed by a sharp decrease from 1920 to 1921, after which the rapid rise began once again. The production for 1921 was approximately the same as for 1911, and the curve from 1921 onwards might be thought of as a prolongation of that up to 1911, as if in fact the decade which intervened had been without any permanent influence on the expansion of the industry. During the period 1921 to 1926 the production has roughly doubled itself, or has increased at a compound rate of 14½ per cent. per annum. Taking similarly the period 1911 to 1926 as that in which doubling of the production has been effected the compound rate becomes 4½ per cent. We may conclude that the rate of increase to be anticipated in the near future lies somewhere between these figures. If we estimate it at 10 per cent. it follows that in every year an addition to the world's productive capacity, beginning now at 125,000 tons of nitrogen, and increasing, is necessary. For economic reasons this increase is being provided by synthetic and not by natural nitrogen, and not only is this the case, but, in addition, the synthetic product is gradually replacing Chile nitrate. The other chief source of nitrogen—namely, by-product ammonia, is shown to be almost stationary, or even decreasing.

Population and Food

There is a very direct connection between the increase in the world's population and the world's requirements of fixed nitrogen. It may be assumed that for at least 500,000 years a human being differing very little from his present form has inhabited the earth. In all that time, up to A.D. 1800, the world's population had increased from its beginnings to a figure estimated at 800 millions. In the next 100 years, from A.D. 1800 to A.D. 1900, it rose to 1,730 millions—that is, it more than doubled itself, and this rate of increase, or something approaching it, is continuing to-day. This rate obviously cannot be continued indefinitely under any circumstances; it cannot go on at all unless the productivity of the soil keeps pace with it.

During the 100 years to which the figures I mention apply, the necessary increase in the food supply was brought about by bringing into bearing virgin tracts in all parts of the world. The end of this type of development is already in sight. Estimates have been made of the maximum productivity of the world's soil using present methods of farming, and these estimates indicate that with all of the available acres in the world producing at their maximum, if the present rate of increase in the population continues, there will be a definite food shortage before the end of the present century.

Obviously this danger could be averted by some means of restriction of the rate of increase of the population. It could be averted, or postponed, by the introduction of new forms of food not requiring methods of production based upon agriculture. The only method, however, which is of immediate application lies in the direction of increasing the output per unit of agricultural land. This involves a large increase in the use of inorganic fertilisers, and of these the most expensive to-day, and the most important, is nitrogen. These considerations lead to the conclusion that the nitrogen industry must inevitably develop to a point where it must become one of the most important manufactures, such as coal, steel, shipbuilding, etc.

This conclusion is not new. In his address to the British Association in 1898, Sir William Crookes, who fifteen years ago was presented with the medal which I had the honour of receiving the day before yesterday, pointed out the absolute necessity of preserving and adding to our resources of nitrogen. In his words: "The fixation of atmospheric nitrogen, therefore, is one of the greatest discoveries awaiting the ingenuity of chemists. It is certainly deeply important in its practical bearings on the future welfare and happiness of the civilised races of mankind." Since that date very great progress has been made. At places where cheap water power was available the cyanamide industry and the industry based upon the oxidation of air in the electric arc have made great strides. There has also been a large development in the output of the Chile nitrogen deposits.

The Haber-Bosch Process

It was not, however, until the development in Germany of the Haber-Bosch process that a means was provided of supplying the world's increasing requirements to an almost unlimited extent at a cost figure which the world could afford to pay. This is still the position to-day.

The processes based upon the Haber-Bosch discovery to-day hold the field to the exclusion, so far as can be seen at present, of all others. This manufacture was commenced in Germany in the year 1913. The conditions due to the war, when Germany was unable to import natural nitrates from Chile, gave the industry an enormous development, and the production in Germany to-day is of the order of 500,000 tons of fixed nitrogen per annum by this process. In this country also the war showed the imperative necessity of home production of fixed nitrogen. The difficulties of obtaining supplies of Chile nitrate proportionate to the enormous demands made by the fighting forces became almost insuperable, and the Government decided in 1917 to erect a plant on the Haber-Bosch principle.

Owing to the very heavy calls upon the Government's scientific staff during this period, however, very little progress was made, and when the end of the war came the Government had to decide whether they should endeavour to carry on this industry themselves, or whether they would be content by encouraging private enterprises to take it up where they had left off.

The Billingham Project

At this stage, at the request of the Government, the matter was taken over by Brunner, Mond and Co., through their subsidiary Synthetic Ammonia and Nitrates, Ltd. This latter company appointed a staff of scientists and others, and attacked the problem from the beginning. They were unable to obtain the information they required as to working the process from Germany, or elsewhere, and were compelled to work the process out for themselves. The steps taken by them were as follows :—

After preliminary study of the problem they took over a tract of some 800 acres at Billingham, near Stockton-on-Tees. They erected thereon a laboratory specifically designed for the type of work they were endeavouring to do, and differing entirely from any other laboratory in the kingdom, inasmuch as it had to undertake a new technique—namely, that of high-pressure work. In this laboratory was erected a complete model of a synthetic ammonia plant, beginning with water gas and ending up with ammonium sulphate ; this whole plant being capable of being worked continuously and upon a 1 300 scale, based on the plant it was proposed to erect first upon the Billingham site.

While this work was going on, a plant to make two tons of ammonia a day was simultaneously erected at the works of Castner-Kellner, Ltd., where considerable quantities of hydrogen made as a by-product, in the caustic and chlorine industry, were available. This experimental plant, since greatly increased, came into operation in May, 1921, and has been working continuously since that date.

The next step was to erect a complete plant at Billingham for the manufacture of 120 tons of sulphate per day, which was subsequently increased to 250 tons of sulphate per day. This plant came into operation in December, 1923. It is now producing 65 tons of ammonia a day, most of which is converted into sulphate.

The sulphate radicle required to fix the ammonia is obtained, not from sulphuric acid, but from anhydrite, of which mineral there is an inexhaustible supply at a depth of some 700 ft. below our site. The use of this salt not only makes us independent of imported sulphur or sulphur compounds, but effects a very great saving in both capital and running costs as compared with the process which uses the free acid for neutralisation. At the moment we are using anhydrite from another neighbouring source, but a mine of our own is now being sunk, and will be worked within a year.

We are now building a further unit for the manufacture of 165 tons of ammonia per day, with the corresponding sulphate plant, and at the same time erecting other by-product plant for the manufacture of nitric acid, ammonium nitrate, anhydrous ammonia, ammonium carbonate, and nitro-chalk. Some of these plants are already in operation, and the whole of this development, it is hoped, will be completed before the end of this year. We propose to go on afterwards to a further unit, doubling again our total capacity, but converting the NH_3 formed into ammonium phosphate, nitro-chalk, and other compound fertilisers.

Even when these developments are complete, we shall in England still be obviously a very long way behind our chief competitor, Germany. We hope, however, to go on still further reducing the gap between ourselves and them. Development is, of course, taking place on similar lines in many other countries, but I think I am right in saying that, with the exception of Germany, we are a long way ahead of any other competitor.

Chile Nitrate

You may wish me to refer to the question of Chile nitrate. So far as I am able to judge the situation, Chile nitrate, which has in the past few years sold at a price considerably higher than the synthetic product per unit of nitrogen, has been in the position of supplying that quantity of the world's demand which could not be produced either from by-product plants or from synthetic plants. This appears to be the position to-day. The question is clearly an economic one.

To the agriculturist synthetic nitrogen and natural nitrogen are essentially identical, and the only factor which will decide the relative productions of the natural and the synthetic product will be cost of production and, therefore, sale price. The future of Chile nitrate must depend upon the extent to which the producers can reduce their costs, but so far as I am able to estimate the situation, it is hardly possible that they can ever get down to cost figures already attainable synthetically, leaving out of account the very large possibilities in improvement of synthetic processes and consequent further cost reductions. The Chile product sells not only for agricultural but also for industrial purposes, for the manufacture of nitric acid, potassium nitrate, and similar products. In these fields also, owing to the development of ammonia oxidation processes, the competition of the synthetic product is rapidly making itself felt, and I do not think it will be many years before the import into this country of Chile nitrate will cease to be economic. The importance of this conclusion from the standpoint of national economics requires no emphasis from me.

Technical Difficulties and Achievements

I should now like to touch on certain technical points in connection with the industry. One of our greatest difficulties in establishing the high pressure industry in this country was due to the fact that it was impossible to obtain from existing engineering firms the type of valve, joints, etc., required for very high pressures. One of the biggest achievements of our engineers was the development of our own manufacture of this type of apparatus. So satisfactorily was this done that our high pressure apparatus is in many respects simpler to operate and easier to maintain than low pressure plant.

We have devoted a good deal of time to chemical engineering problems of a more theoretical kind such as the fall of pressure in pipes and vessels of various shapes, the transference of heat across metal walls or from liquids to gases, and the allied problems of absorption of gases in liquids. The practical results of experiments and calculations on these and similar problems more than outweigh the disadvantages due to the starting up of types of plant of which no one had had previous experience.

Closely related to laboratory and design work of this kind is the question of quantitative measurements on the plant. It has been our object to know at any moment the flow of gas, liquid, or solid at every point, to record every temperature and pressure which in any way affects the running of the plant, and to analyse each intermediate product wherever its composition changes. These data are recorded at frequent intervals on sheets and form the basis of plant control. More than a million physical measurements are recorded, and far more observed, each year. This policy, of course, involves an exceptionally high expenditure as well as much research on instruments, and we have become comparatively large designers and manufacturers of instruments for our own use. Wherever possible, we use instruments which will not only indicate the physical condition but will regulate these conditions as we wish them to be kept, using, in fact, automatic controls in place of unskilled labour. Quantitative measure-

ment is the foundation of science, and it is our adherence to scientific method which accounts for the success which we have had.

Chemical Problems

I have not yet mentioned our chemical problems. Physical chemistry is, of course, the basis of all our processes, and we have adopted throughout the following procedure in all our developments. When a new method of manufacture is suggested, the problem is first considered from a broad thermodynamic point of view. If the result of the theoretical investigation shows that it should be possible to carry out the reactions involved, the second phase is attacked: this involves the production of a flow sheet showing quantitatively the history of all materials from the time of entering to the time of leaving the plant, and the heat and energy changes throughout the processes. The third stage is then reached and a cost estimate is prepared from the flow-sheet: this is based on known costs of vessels, machines, power, labour, raw materials, and incidental costs. If the conclusions from this preliminary cost estimate are favourable, we proceed to erect a semi-technical plant, the working of which supplies the details necessary for the final designs which cannot be deduced accurately from purely theoretical considerations.

In the course of filling in the details much laboratory research is needed. There are some problems, such as corrosion, metallography, and the behaviour of catalysts, which always occupy our attention: others arise which can sometimes be settled more permanently. Much information must also be collected on the physical properties of substances in the plant. I might almost say that there is no physical property of the gases we use which does not interest us.

Co-operation between the research, operating, and design branches has been made easier by the exchange of personnel between departments. The managers of plants are all chemists and engineers who have been trained in the methods of the laboratories: the research men are all given actual plant experience, and the engineers in charge of new design have usually been recruited from the laboratories or the manufacturing plant.

Developments in Contemplation

I have now concluded what I have time to say on the subject of nitrogen developments themselves, and I would like to add a few remarks on certain other processes which we are developing, or proposing to develop.

I wish to emphasise at this point the absolute necessity for Great Britain to make herself independent, so far as may be possible, of imported raw materials, and largely through our connection with the high pressure nitrogen industry we are now able to see many ways in which this end can be furthered. We know, for example, that it is possible to replace natural oils imported from America and other countries by products made by the hydrogenation of coal, and although the process has not yet been fully developed, there are good reasons for believing that it will ultimately prove economical. We are already erecting plant for the manufacture of methanol from water gas, and therefore indirectly from coal and coke, and there is some indication that it may be possible to carry this type of manufacture as far as to produce higher alcohols as well. In addition to this we see the possibility of creating an industry based upon the conversion of methane, obtained by the distillation of coal, into acetylene, from which substance a large number of organic products which may be said to belong to the heavy organic chemical industry, *e.g.*, acetic acid, may be produced.

This field of research, namely, the replacement of products obtained from agricultural operations in this country and elsewhere by products obtained from coal, is one of the widest importance and one to which the attention of all chemists and engineers of this country should be directed.

Industry as a Career

It is well known to all that in all these matters Great Britain has hitherto been content to follow the lead of the Germans. The reason for this is not that the German individual chemist or engineer is better than his opposite number in this country. It is simply that there are a great many more men of the type of training required working on these problems in Germany than there are here. This country, up till the war, had had a very long period of extreme industrial prosperity. During that period there had been a tendency for the best men in the country to neglect industry and enter the Civil Service, the Army, the Navy, the law, and similar professions.

In Germany and in America this condition of affairs has not arisen, and industry has the first call on the brains of the country. The British Empire will be compelled to change in the same direction. For the developments that we now have before us, it is with some difficulty that men of the required qualifications can be found. The qualifications required are a thoroughly sound general education, followed by the equivalent of an honours degree in science or engineering and at least one year's research experience. There are, no doubt, many places in industry for the sound practical man, but what we now need for our industrial development is, above all, the sound theoretical man.

Training the Right Men

Fortunately the supply of the theoretically trained man is following the demand. I am glad to be able to say that in conjunction with the universities and a number of the public schools we are endeavouring to swell the stream of recruits of this type trained for the purpose of our kind of industry. It will, however, be some years before the effect of this development can be perceived. I should like, however, to suggest to parents whose sons are now at school that they should consider equipping those sons for a career in which they will be capable of assisting in the application of science to industry and of assisting to rehabilitate Great Britain in her position as a leader among the chief manufacturing countries in the world.

I am myself convinced that no country is in a better position than Great Britain to-day, as in the past, to lead in the world's industry. Her chemists and engineers are second to none, the mechanics and workmen even at comparatively high rates give as good or a better result on the outlay than in any country I know, and all that is required to enable the country to take its proper place in the world's industry is scientific leadership and control, and a realisation that the methods employed in the past must be replaced by methods based on a much closer study of the application of science to manufacture.

Joint Meeting with Biochemists

Chemistry of the Carbohydrates

On Wednesday, July 6, as part of the proceedings of the annual meeting of the Society of Chemical Industry in Edinburgh, there was a joint meeting with the Biochemical Society, the chair being taken by Professor G. Barger, F.R.S. The subject under discussion was "The Physiological and Industrial Aspect of the Chemistry of the Carbohydrates."

Professor W. N. Haworth read a paper on "Structural Relations in the Carbohydrate Group." He said that the fundamental change of viewpoint from which the carbohydrates were now surveyed was to be attributed to the recognition that the common forms of monosaccharides were six-membered heterocyclic compounds, having a cyclic structure known as a lactol ring; the same type of ring was also present in galactose, normal fructose, arabinose, in that form of mannose which was related to α-methylmannoside, in rhamnose glucoside and other common sugars of the simplest nature. He proceeded to deal with stereochemical questions involved. By stressing the 6-ring lactol formula of sugars it was not suggested that they persisted or reacted only in that form.

Professor Howarth also discussed the disaccharides and the polysaccharides. In regard to the latter, he dealt with the way in which X-ray methods of investigation were being carried on hand-in-hand with chemical ones. The urgent problem in carbohydrate chemistry, he said, was to decide whether cellulose was a *substance* as they understood the term in chemistry, or whether it was a polymerised product which might vary in complexity according as polymerisation had extended to a greater or less degree; and also whether that type of polymerisation involved a molecular aggregation depending upon the readjustment of principal valencies, or whether subsidiary valencies promoted that change without calling into play any principal valency.

"Recent Advances in Our Knowledge of Starch" were discussed by Professor A. R. Ling. He dealt especially with recent work done in his department (by himself and his collaborators) on amylose, amylohemicellulose and *iso*maltose.

Insulin and Diabetes

A physiological aspect of the subject under discussion was treated by Dr. C. J. Lambie in a paper on "Intermediary Carbohydrate Metabolism." He pointed out that much light had been shed upon the subject by a study of what happened in diabetes. The essential problem raised by a review of the manifold metabolic changes occurring in that disease was to discover the locus of insulin action in the intermediary metabolism. Observations upon the respiratory metabolism indicated that the point of attack of insulin was the glucose molecule itself or its immediate decomposition products. Insulin accelerated the combustion of carbohydrates, but any explanation as to the nature of its action had to account not merely for that increased oxidation of glucose but for glycogen formation and for the changes which occurred in protein and fat metabolism. Assuming that an equilibrium existed between glucose and dihydroxyacetone, and that in the presence of insulin that equilibrium was driven in the direction of dihydroxyacetone, and in the absence of insulin in the opposite direction, many of the observed facts of normal and pathological metabolism, including the phenomena of diabetes, would receive a simple explanation.

Drs. C. J. Fox and L. Hall, of the Cross and Bevan Laboratories, London, submitted a paper on "Cellulose from the Industrial Standpoint," which was read by Dr. C. P. Stewart. The authors pointed out that the technical applications of cellulose had been until recently almost wholly dependent upon the skill of engineers and craftsmen and the prescience of business men, but that latterly the chemist had been playing an ever-increasing part, with the result that the future was going to be very largely dependent upon his efforts.

The paper referred to developments in the textile industries, such as artificial silk, and in paper and timber products. The industrial problems of the present and future were unlimited in number and in interest. What was the source from which should come the raw materials for the ever-increasing demands of the cellulose industries, old and new? Which of the 2,000 fibre plants available should be selected from which to derive the thoroughbred and cross-bred cultivated products of the future? Cotton and jute had obtained their eminence; why not others? Would it be feasible to extend the use of wood cellulose as a substitute for cotton, and could afforestation meet the increased demand, as well as that of the ravenous newspaper trade, and, of course, the timber trades? Those and others were questions of the hour.

The Coal Cleaning Conference

Joint Meeting with Gas Engineers and Coke Oven Managers

During the meeting of the Society of Chemical Industry a Coal Cleaning Conference was held on Thursday, July 7, under the joint auspices of the Society's Fuel Section, the Institution of Gas Engineers, and the Coke Oven Managers' Association. Dr. C. H. Lander, director of the Fuel Research Station, presided. The following is an account of the papers read and the discussion which followed.

Dr. Lander, in opening the proceedings, said there were two conflicting factors, generally speaking, on the subject of coal cleaning—the consumer who wanted pure coal but did not want to pay for it, and the producer who wanted to sell as much ash as he could get the consumer to take. In pneumatics and hydraulics, the engineers and chemists interested in coal cleaning were in the dark ages. Coal cleaning depended in very great measure on exactly the same science as had made it possible during the last few weeks for Americans, single-handed, to fly to Europe. That achievement had been made possible by the mathematical and physical study of air currents and the behaviour of falling bodies.

The first paper, "A Comparison of Processes for the Cleaning of Coal," by Dr. W. R. Chapman and Professor R. V. Wheeler, F.R.S., was read by Dr. Chapman. The authors made a comparison of all the processes of wet and dry cleaning, and concluded that there could be no one process that was universally the best. The choice of a process depended upon such matters as the desirability of a wet or a dry process, the ultimate use to which the coal was to be put, and the space, building and necessary plant available. The choice, however, would depend primarily on the nature of the coal. In that respect guidance was given by a series of screening analyses of the raw coal, and by a series of float and sink tests on sized samples of the raw coal in a number of liquids of different specific gravities. Screening analyses would indicate the extent to which the distribution of sizes of the raw coal varied from time to time; and float and sink tests would indicate the uniformity or otherwise of the raw coal.

Dr. Lessing said that while it was desirable to improve the quality, British coals could always hold their own with foreign coals—in fact, they were superior. As chemical engineers they ought to insist that cleaning operations should be carried far, and improvements effected, as the raw coal contained a vast amount of matter that was not wanted.

Pneumatic Separation

Mr. C. W. H. Holmes contributed a paper entitled "Notes on the Cleaning of Coal with Special Reference to Pneumatic Separation." In this contribution interesting details were given of the investigations on pneumatic separation carried out during the last three years in the testing plant and the laboratory of the Birtley Iron Company. Mr. Holmes mentioned that the process of pneumatic separation had already begun to play its part in connection with the carbonisation industries. In Glasgow at the present time nearly 200 tons per hour of gas coal were being cleaned on the "S. J." type separator; and a further plant treating forty-five tons per hour of coking slack on the "Wye" type separator would be in operation by the time the paper was read, whilst plants having a total capacity of 500 tons per hour were under construction.

"A Consideration of Certain Problems encountered in the Preparation of Coal for the Market," was the title of the next paper, read by Mr. F. S. Sinnatt. Mr. Sinnatt said that the preparation of the coal for the market might be defined as the process by which natural products, more or less impure, were converted into products more suitable for commercial utilisation. The process embraced sizing; purification by dry or wet processes; blending; disposal of waste products and effluents. The sequence in which these were carried out varied with the general scheme of purification in operation. In view of the work of Lessing and Cobb, the process, he said, might in the future include the treatment of coal with chemical substances to influence its behaviour on carbonisation or combustion.

In the discussion which followed, Mr. J. W. McLusky (Glasgow) said that in the gas industry they believed that the buying of coal was the most important matter, and if they could get throughout the year coal equal to samples submitted at the beginning of the year, then 50 per cent. of their task was accomplished. Referring to the sizing of coal, he said that when they in the gas industry asked for certain sizes of coal they had no idea of what they might get. They had had engineers say that they had sufficient double nuts, but double nuts built too closely for their purpose—broken coal was better. At Dawsholm gasworks in Glasgow they got a continuous gas production from broken coal, and an intermittent gas production from other kinds.

The fourth paper, "Froth Flotation Applied to a Baum Washer," was presented by Mr. Walter Guider, who submitted that the advantages accruing from the froth flotation plant entirely justified its installation. Professor Louis and Mr. Krall briefly discussed this paper.

Arising out of the conference, the following resolution, proposed by Dr. E. W. Smith, and seconded by Mr. McLusky, was carried unanimously: "That this meeting of gas engineers, coke oven managers, and mining engineers, attending the Coal Cleaning Conference held during the annual meeting of the Society of Chemical Industry in Edinburgh, resolves that the Committee on Colliery Requisites of the British Engineering

Standards Association be requested to consider the standardisation of the sizing nomenclature relating to coal."

The proceedings closed with a hearty vote of thanks to Dr. Lander (the chairman), and Dr. E. W. Smith (hon. secretary).

The Chemical Engineering Group

MR. F. HERON ROGERS, M.I.Mech.E., M.I.Chem.E., presided on Wednesday, July 6, at a meeting of the Chemical Engineering Group, and a paper on "Some Aspects of the Manufacture of Fibrous Cellulose" was read by Colonel J. L. A. Macdonald, D.Sc. Colonel Macdonald said that many eminent men had been associated with the development and technology of chemical pulp production, and the position of the wood pulp industry to-day was a worthy monument to their achievement. Nevertheless, the industry was based upon an empirical foundation, inasmuch as but little was known of the fundamental processes involved—namely, the action of the alkali or acid upon the non-cellulosic components of the original wood complex. In general terms the paper-maker was by no means critical of the real quality of the pulp he bought, provided it approximated to his ideas of price and apparent suitability. A discussion followed, and a section of a film showing the activities of the Inveresk Paper Company, Ltd., and its associated companies was exhibited.

U.S. Government Research and Patents

Interesting Legal Decision

A UNITED STATES Government chemist, Mr. H. W. Houghton having been employed generally to do research work, and having been subsequently assigned to investigate the efficacy of a fumigant to kill insects and animals, claimed to own the patent rights to the solution of the problem. The Court, however, ruled that these rights belonged to the Government. The opinion was rendered by Judge Soper of the U.S. District Court of Maryland. Mr. Houghton conducted his experiments at Edgewood Arsenal. The fumigant was cyanogen chloride. Judge Soper said in part in his opinion :—"The discovery was within the purview of the investigation with which he was employed. He formally reported experiments with glycerine and water which led to the invention. It is stipulated in the case that experiments in the process were made during the months of September and October, and that during portions of these months, he was on duty; so that from the record it would appear that his experiments were performed, even if his final results were not achieved while he was officially employed. In any event, having agreed in advance that he would investigate for the benefit of the United States a suggestion of his superior officers, he cannot evade his obligation by developing it while on leave. The invention and the patent application covering it are the property of the United States."

Chemicals at the Royal Agricultural Show

FERTILISERS of various kinds, both artificial and natural, were exhibited by several firms at the Royal Agricultural Society's Show at Newport last week. Nitram, Ltd., exhibited nitrate of lime, sulphate of ammonia, and copper sulphate, together with literature dealing with these products; other features of interest were models showing the new system of grassland management. The Chilean Nitrate Committee exhibited nitrate of soda and caliche raw material for fertilisers, together with information on the use of fertilisers, while 60 per cent. tribasic phosphate of lime was displayed by the Egyptian Phosphate Co., who also showed Ephos basic phosphate. Superphosphates, potassic phosphate, artificial fertilisers, and compound manures were on view at the exhibit of the Basic Slag and Phosphate Co. The effect of potash fertilisers was demonstrated by the United Potash Co., who exhibited examples of both sulphate and chloride of potash fertilisers. Other firms showing exhibits of artificial manures and fertilisers were Osmond and Son, Ltd., British Glues and Chemicals, Ltd., and Joseph Ashworth and Sons, Ltd., whose specialities are bone superphosphate compounds. The use of cellulose paints and varnishes in agriculture was illustrated by Naylor Brothers, London, Ltd., and the Uniflo Pump Co. showed a new pump specially made for farm purposes, while Sentinel Waggons were also represented.

Mond Nickel Co. Meeting

Satisfactory Results and Promising Outlook

THE annual general meeting of the Mond Nickel Co., Ltd., was held in London on Friday, July 8. Sir Alfred Mond (chairman of the Company), who presided, said, in presenting the report, that the profit and loss account showed a reduction in the net profit of £30,323. In view of the fact that in the past financial year they had had a general strike and a coal strike to contend with, both of which had hampered and interfered with the operations of the company in this country, he thought that the shareholders could congratulate themselves on the fact that the financial results of the year had been maintained on such a satisfactory level.

In the course of last autumn, accompanied by the deputy chairman and his brother, Mr. Robert Mond, he visited their mines and smelter in Canada, and went thoroughly into the condition of matters there. He found that everything was working very smoothly and efficiently. He also visited their various mines. The company was in a very fortunate position, for year by year it had very largely increased its ore reserve, and at the present time he could say that on a conservative estimate, at the present rate of production, they had from 40 to 45 years' proved ore which it could take out. That did not, of course, mean all the ore which they had. The visit was further extended to their subsidiary company, now known as the American Mond Nickel Co., at Clearfield, Pennsylvania. Certain alterations in the organisation had been effected, and he believed that the business would become very remunerative.

Disposal of Products

With regard to the sales and deliveries of their products, they were large manufacturers of copper sulphate, and in spite of the strong competition of local makers in consuming countries, they had always been able to place all they produced. Prices were considerably better than in the previous year, and at the end of the present season which was now about to terminate the stocks to be carried over were insignificant. Coming to nickel, which was their main product, the outlook was more promising than it had been at any time within his recollection. Their deliveries during the last financial year had exceeded those of any previous year.

They were producers of the platinum metals on a somewhat considerable scale. They were in a somewhat fortunate position with regard to these metals, as they occurred with the nickel-copper in the ores, and were recovered at the end of their extraction process automatically. They really cost them nothing. They had for some time been refining some of the South African platinum at their Acton works. They had also been keeping in touch with the Norite sulphide platinum occurrences in South Africa, and the process which the Mond Nickel Co. was operating would probably be suitable for the purpose of extracting the metals from the ore concentrates.

The report and accounts were adopted. The retiring directors, the Rt. Hon. Sir Alfred Mond, Viscount Erleigh, Sir R. A. Hadfield, and Mr. Robert Mathias were re-elected. Details of the accounts were given in the company news columns of THE CHEMICAL AGE last week.

Education or Experience

THE Lecturer in Geography at the London University, Mrs. E. G. R. Taylor, is anxious, according to *The Evening Standard*, to discover the kind of training which will best fit her son for a business career. Mrs. Taylor, in pursuance of this object, advertised in these terms :—"Parent of boy (16) will spend £1,000 training him to specification of employer offering opportunity for career." Mrs. Taylor, as a member of the staff of the London University, may well be excused for harbouring the obsession that education and training are all that is necessary to make success in a commercial or any other career. It is not surprising that Mrs. Taylor's advertisement has failed to bring to her any satisfactory results. She has received several offers to take the boy in return for a £1,000 investment, but not a single man of high standing in the commercial world has bothered to answer her request. She will now know that there is no royal road to the achievement of her object. All she can do is to give the boy a good general education and then place him on any office stool that she can find, leaving it to him to make his own career.

Chemical Trade Returns for June

Position Steadily Improving

According to the Board of Trade returns for June, the value of chemicals, drugs, dyes, and colours imported during that month amounted to £1,238,001, being a decrease of £134,063, as compared with June, 1926; the value of exports amounted to £1,987,025, an increase of £91,978; and of re-exports to £100,438, an increase of £11,126. For the six months ended June 30, the value of imports amounted to £8,068,251, an increase on the corresponding period of 1926 of £541,799; of exports to £11,529,567, an increase of £25,444; and of re-exports to £486,936, a decrease of £51,159. The detailed returns are given in the following tables:—

Imports

	Quantities. Month ended June 30,		Value. Month ended June 30,	
	1926.	1927.	1926.	1927.
			£	£
Chemical Manufactures and Products—				
Acid Acetic .....tons	959	1,574	38,468	71,239
Acid Tartaric .....cwt.	5,300	4,095	26,293	20,221
Bleaching Materials ,,	10,337	14,053	9,985	9,756
Borax ..... ,,	9,321	11,984	10,335	13,304
Calcium Carbide .. ,,	40,121	69,355	28,430	44,398
Coal Tar Products, not elsewhere specified value	—	—	137,762	99,309
Glycerine Crude ....cwt.	715	1,683	2,044	5,999
Glycerine Distilled ,,	156	360	671	1,786
Red Lead and Orange Lead .....cwt.	3,029	4,382	5,513	7,703
Nickel Oxide ..... ,,	4,503	—	25,300	—
Potassium Nitrate (Saltpetre) .....cwt.	7,029	7,779	8,083	9,049
Other Potassium Compounds .....cwt.	85,669	79,558	38,815	37,130
Sodium Nitrate ..... ,,	9,537	76,910	6,068	48,796
Other Sodium Compounds ..... ,,	26,414	40,182	17,136	25,017
Tartar, Cream of .. ,,	3,978	3,976	14,539	17,297
Zinc Oxide .....tons	1,138	1,006	35,929	35,070
All other sorts ....value	—	—	346,714	256,879
Drugs, Medicines, etc.—				
Quinine and Quinine Salts .....oz.	129,470	114,948	10,991	9,606
Bark Cinchona, etc.. cwt.	1,766	1,933	8,229	9,505
Other sorts .....value	—	—	281,314	153,500
Dyes and Dyestuffs, etc.—				
Alizarine .....cwt.	219	98	5,099	5,050
Other Sorts ..... ,,	2,594	3,167	54,718	80,960
Cutch ..... ,,	3,480	2,875	5,397	3,711
Other dyeing sorts.. ,,	5,946	4,988	17,563	16,023
Indigo, Natural .... ,,	37	6	846	158
Extracts for Tanning ,,	77,122	108,053	75,201	111,615
Painters' Colours and Materials—				
Barytes, ground, and Blanc Fixe.. ....cwt.	64,412	64,186	15,125	15,183
White Lead (dry).... ,,	14,886	9,865	28,484	16,549
All other sorts..... ,,	77,058	109,760	117,012	113,128
Total of Chemicals, Drugs, Dyes, and Colours .....value	—	—	1,372,064	1,238,001

Exports

Chemical Manufactures and Products—				
Acid Sulphuric ....cwt.	5,447	2,611	4,020	2,864
Acid Tartaric ..... ,,	810	1,607	4,164	10,565
Ammonium Chloride (Muriate) .....tons	245	496	6,580	10,036
Ammonium Sulphate—				
To Spain and Canaries tons	4,042	12,988	43,046	130,715
,, Italy ..... ,,	43	345	487	3,572
,, Dutch East Indies tons	174	967	1,939	10,389
,, Japan ..... ,,	4,816	12,982	54,129	136,609
,, British West India Islands and British Guiana ....tons	1,077	1,039	12,571	11,685
,, Other Countries ,,	2,118	5,421	25,803	57,983
Total ..... ,,	12,270	33,742	138,035	350,953

	Quantities. Month ended June 30,		Value. Month ended June 30,	
	1926.	1927.	1926.	1927.
			£	£
Bleaching Powder (Chloride of Lime)..cwt.	25,662	30,974	13,129	12,510
Coal Tar Products—				
Anthracene .....cwt.	—	—	1	—
Benzol and Toluol..galls.	147	1,309	15	156
Carbolic Acid ....cwt.	9,428	10,039	14,103	24,763
Naphtha .....galls.	6,071	4,149	615	456
Naphthalene .....cwt.	1,424	864	897	707
Tar Oil, Creosote Oil, etc. .....galls.	6,902,246	3,376,367	211,907	116,091
Other Sorts .....cwt.	28,714	64,341	20,285	33,603
Total ....value	—	—	247,823	175,776
Copper, Sulphate of..tons	4,779	6,033	100,179	128,980
Disinfectants, etc...cwt.	33,131	27,083	79,547	68,229
Glycerine Crude .... ,,	2,243	485	6,431	1,507
Glycerine Distilled .. ,,	9,788	8,872	40,765	43,622
Total ..... ,,	12,031	9,357	47,196	45,129
Potassium Compounds—				
Chromate and Bichromate .....cwt.	1,334	1,572	2,448	2,847
Nitrate (Saltpetre) ,,	2,139	1,406	4,209	2,147
All other Sorts .... ,,	1,498	1,089	10,095	13,329
Total ..... ,,	4,971	4,067	16,752	18,323
Sodium Compounds—				
Carbonate .....cwt.	399,457	450,676	119,757	133,857
Caustic ..... ,,	136,605	195,505	106,326	135,173
Chromate and Bichromate .....cwt.	2,992	2,263	4,287	3,090
Sulphate, including Salt Cake .....cwt.	149,216	79,635	20,816	12,813
All other Sorts .. ,,	51,973	68,696	39,019	46,458
Total .... ,,	740,243	796,775	290,205	331,391
Zinc Oxide .....tons	129	67	5,262	3,054
All other Sorts .....value	—	—	258,300	269,124
Total .... ,,	740,243	796,775	290,205	331,391
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs).....value	—	—	1,211,192	1,426,934
Drugs, Medicines, etc.—				
Quinine and Quinine Salts .....oz.	192,628	110,858	20,458	11,098
All other Sorts....value	—	—	281,699	185,933
Total ..... ,,	—	—	302,157	197,031
Dyes and Dye-stuffs—				
Products of Coal Tar cwt.	4,973	5,387	51,684	48,153
Other Sorts ..... ,,	6,374	7,156	9,400	8,543
Total .... ,,	11,347	12,543	61,084	56,696
Painters' Colours and Materials—				
Barytes, Ground, and Blanc Fixe .....cwt.	6,146	1,280	2,228	739
White Lead (dry)... ,,	6,993	4,187	13,563	8,046
Paints and Colours in paste form.....cwt.	45,062	42,306	104,260	89,420
Paints and Enamels Prepared (including Ready Mixed) .....cwt.	31,492	32,237	99,057	112,044
All other Sorts ..... ,,	62,239	52,695	101,500	96,115
Total ..... ,,	151,932	132,705	320,614	306,364

(*Continued on page* 59)

(Continued from page 58)

	Quantities. Month ended June 30. 1926.	1927.	Value. Month ended June 30. 1926.	1927.
Total of Chemicals, Drugs, Dyes, and Colours ... value	—	—	1,895,047	1,987,025
Re-exports				
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Tartaric .....cwt.	78	120	473	746
Borax ..... ,,	126	59	160	70
Coal Tar Products value	—	—	22	3
Glycerine Crude ....cwt.	180	—	540	—
Potassium Nitrate (Saltpetre) .....cwt.	46	375	73	400
Sodium Nitrate .... ,,	597	1,132	416	803
Tartar, Cream of .. ,,	311	754	1,253	3,318
All other Sorts ....value	—	—	18,079	54,961
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	15,631	15,229	1,851	1,708
Bark Cinchona, etc. cwt.	362	207	4,070	879
All other Sorts ....value	—	—	37,597	29,344
DYES AND DYE-STUFFS—				
Cutch .....cwt.	896	542	1,301	936
Other Dyeing Extracts cwt.	229	81	1,180	668
Indigo, Natural .... ,,	—	—	—	1
Extracts for Tanning ,,	12,024	1,538	11,930	2,077
PAINTERS' COLOURS AND MATERIALS .....cwt.	1,194	1,675	5,810	4,208
Total of Chemicals, Drugs, Dyes, and Colours ...value	—	—	89,312	100,438

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published ; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

65 (*Leather Charcoal and Dried and Carbonised Blood*).—" I should be glad if you could assist me with the names of firms supplying leather charcoal and dried and carbonised blood."

Replies

64 (" *Mulsoid* " *and* " *Lanoid*," *July* 9).—We are informed that the firm handling " Mulsoid " and " Lanoid " (not " Lanoloid ") is the Harding Chemical Co., Ltd., New Thomas Street, Pendleton, Manchester.

44 (*Ethyl Cellulose, May* 7).—J. M. Steel and Co., Ltd., Calder Street, Lower Mosley Street, Manchester, state that they are now in a position to offer ethyl cellulose, which they are importing direct from the manufacturers in Germany.

A Uniform Flow Pump

A PUMP working on a principle which is claimed to give rise to a uniform-flow has been designed by the Uniflo Pump Co., Ltd., of Fordhouses, near Wolverhampton. This machine which is known as the " Uniflow " pump, is a high-speed reciprocating unit. Owing to the uniformity of flow, there is said to be no hydraulic shock and no slip through the valves. The pump also exhibits freedom from mechanical noise. Several sizes are built, the H-type having been produced in order to meet the demand for a small pump for working either by hand or by power, incorporating all the advantages of the larger " Uniflow " designs. These small instruments will pump up to 600 gals. per hour against a total head of 30 ft. On intermittent work this head may actually be exceeded. The body of the H-type " Uniflow " pump is of best quality cast iron, the main bearing being of phosphor bronze. The valves are brass, working in a brass barrel with phosphor bronze piston rings. Drawn manganese bronze is used for the pump rods, and the automatic glands are in brass. The rollers run on ball bearings. The pump is self priming to a high degree and the buckets can easily be removed without the use of a spanner and without disturbing any piping.

Hexyl Resorcinol Patent Action

Further Evidence by Experts

THE action of Sharpe and Dohme Inc. *v.* Boots Pure Drug Co., Ltd. (reports of which were given in our last two numbers), was continued on Tuesday, Wednesday, and Thursday of this week, when the cross-examination of Dr. Oberlander was resumed. The witness expressed the view that the mere preparation of hitherto unprepared homologues of known substances by known methods did not involve research. He emphasised that although in 1881, when systematic organic chemistry was in the making, research might have been involved in the work of Nencki and his collaborators, chemists of the present day had the advantage of 40 odd years of investigation. What was research in 1881 might not be so termed now.

After a brief re-examination by Mr. Kenneth Swan, the witness, in reply to questions by Mr. Justice Astbury, said that in the preparation of the various alkyl resorcinols described in Johnson and Lane's paper and in the plaintiffs' specification, the only variant introduced in order to produce one or other derivative was a change in the fatty acid used. The quantities of all other reagents and the conditions of reaction were not varied. The preparation of the bodies involved two of the simplest possible reactions with perfectly stable reagents.

Before Professor Thomas Gray, of Glasgow, went into the box, the Judge indicated that the evidence should be kept as short as possible.

Professor Gray was examined by Mr. Swan and cross-examined by Mr. Cripps. He pointed out that Nencki's collaborators in investigating the general applicability of the condensation process, had tried first, the condensation of acetic acid with 4 or 5 different phenols, and then had condensed one or other of the phenols with fatty acids up to valerianic acid. The success of these condensations was justification for the assertion that the reaction was generally applicable. It was neither necessary nor practicable for the authors to prepare all the possible homologues ; if 5 phenols and 5 acids were taken, there were, apart entirely from the many possible isomeric acids, 25 acyl phenols possible, and as the field of inquiry was extended, the number of possible derivatives became increasingly extended. He endorsed Dr. Oberlander's views as to the nature of investigations which constituted research.

Professor Gray agreed frankly with Mr. Cripps's suggestions as to a number of so-called general reactions which broke down, but pointed out that chemists were expected to use their scientific intelligence. Reactions which applied to certain members of a homologous series did not break down suddenly ; there were indications of a slowing down or of an increasing tendency to the setting up of secondary reactions. In the reactions with which the Court was concerned, the early literature showed greater ease and improved yields as one proceeded up the homologous series. He would not feel justified in stating what would happen higher up in the series, but would proceed by steps, and if he continued to receive such encouragement as he had indicated, he would take each new step with confidence. Such investigations he would not class as research. The witness was briefly re-examined.

Dr. Joseph Marshall, a chemist in the Boots laboratories, stated that his attention had been drawn to a paper by Dr. Leonard in the Journal of the American Medical Association (**83**, 2005), which indicated that hexyl resorcinol was a very useful intestinal disinfectant. The paper referred to Johnson and Lane, and he at once proceeded to make the substance. At first he had to make caproic acid, and whilst this was being done he tried the process with acetic and butyric acids. Hexyl resorcinol was produced on the manufacturing scale within six weeks.

The action is still proceeding.

Exports Prohibited Except Under Licence

THE following are included in a list (issued under date July 1) export of which is prohibited except under licence : cocaine, diamorphine, ecgonine, morphine, and opium. The prohibition also applies to substances containing certain quantities of these substances. Applications for licences to export should be addressed to the Under-Secretary of State, Home Office, Whitehall, London, S.W.1.

From Week to Week

THE BRITISH DRUG HOUSES, LTD., have just issued their latest catalogue of fine chemical products, dated July, 1927.

SIR J. C. IRVINE, F.R.S., principal and vice-chancellor of the University of St. Andrews, has been invested with the honorary degree of Doctor of Science of Yale University.

BEIT MEMORIAL FELLOWSHIPS for Medical Research have been awarded to Mr. W. K. Slater (a senior fellowship of £700 per annum) and Mr. W. T. J. Morgan (a junior fellowship of £400).

THE BRICK AND FIRECLAY TRADES and the china and earthenware trades are among those dealt with in preliminary report No. 18 of the Third Census of Production, which is published in the *Board of Trade Journal* for July 14.

THE BRITISH COLD STORAGE AND ICE ASSOCIATION, which was founded in 1900, and is the oldest national institution of its kind, has recently changed its name to "The British Association of Refrigeration," report the Executive Council of the Association.

IN RECOGNITION OF HIS LONG AND DISTINGUISHED CAREER at the Department of Metallurgy at Birmingham University, Professor T. Turner was awarded the Oliver Stubbs gold medal at the twenty-fourth annual convention of the Institute of Foundrymen at Sheffield on July 6.

MR. E. P. BARFIELD, managing director of Automatic and Electric Furnaces, Ltd., has sailed for New York to give a series of demonstrations on Wild-Barfield Electric Furnaces (already installed in American works) to a number of engineers and executives of engineering firms in the United States.

DR. E. H. ARCHIBALD, director of the division of chemistry of the University of British Columbia, has retired from the post on grounds of ill-health, but remains professor of analytical chemistry. Associate-Professor R. H. Clark has become director of the division of chemistry and Dr. M. J. Marshall associate-professor of chemistry.

"CHEMISTRY IN WORLD AFFAIRS" is the title of twenty-two conferences which are being held at the new Institute of Chemistry of the American Chemical Society. The conferences will continue throughout this month. Among the European chemists who are participating are Dr. E. K. Rideal, of Cambridge University, who opened a discussion on "The General Theory of Catalysis," and Professor J. C. Drummond, of University College, London, who will open a discussion on "Vitamins."

THE HANBURY MEMORIAL MEDAL, which is given for high excellence in the prosecution or promotion of original research in the chemistry and natural history of drugs, has been awarded to Dr. T. A. Henry, director of the Wellcome Chemical Research Laboratories. The award was made by the following adjudicators under the Hanbury Memorial Trust: the president of the Pharmaceutical Society (Mr. H. Skinner), the president of the Chemical Society (Professor H. B. Baker, F.R.S.), Mr. D. Lloyd Howard, and Mr. A. R. Melhuish.

RECENT WILLS INCLUDE: Sir James Kemnal, of Chislehurst and Poole, managing director of Babcock and Wilcox, £452,726 (net personalty, £438,495).—Professor W. C. Williams, of Goring, Oxford, professor of chemistry at Sheffield University 1883-1904, £56,403 (net personalty, £55,908), out of which he bequeaths £1,000 each to Lady Margaret Hall, Oxford; the Faculty of Science of Sheffield; and the Chemical Society, for the support of its journal and library; £400 to the benevolent fund of the Institute of Chemistry; and the remainder of the sum of £10,000 to the chemical department of the Victoria University of Manchester.

THE UNITED STATES GOVERNMENT'S SUIT against the so-called Franco-German potash trust for an alleged violation of the anti-trust laws is being continued, notwithstanding the fact that the Société Commerciale des Potasses d'Alsace has closed its offices and is to liquidate its business, as the Attorney General wishes to establish a precedent. As the French Government holds a majority share in the company, it was contended in the Federal Court on Monday that the suit was a violation of the rule against suing a friendly Sovereign State. This charge was met by the opinion that agencies of a foreign government engaged in commerce enjoy no privileges not extended to other foreign concerns doing business in the United States and should conform to that country's laws governing such business.

STRONG COMMENTS ON conditions at a railway crossing were made at an inquest on Friday, July 8, at Thornton, on Charles Baynes Timmins, aged 23, manager at the Thornton Alkali works, who was killed when his motor car was struck by a train at a level crossing at the works the previous day. It was stated that there was no automatic lock on the gate, which could be opened by people wishing to cross the line. A witness said that the gate was opened for Timmins, but his car stuck on the crossing. A train came up, struck the car, and carried it along the line. Recording a verdict of "Accidental Death," the Coroner said he had pointed out the danger many times, and would make stronger representation to the Home Office and ask for action. The railway company should have acted before now. One did expect something better than the comic opera conditions that prevailed in some foreign countries.

E. MERCK, of Darmstadt, the well-known German chemical firm, celebrates this year its centenary as regards the manufacture of chemicals.

PROFESSOR DANIEL HANSON, D.Sc., Professor of Metallurgy at Birmingham University, left Southampton for New York on Saturday, July 9.

CONSIDERABLE DAMAGE was done by fire on Sunday morning to the premises of F. C. Calvert and Co., chemical manufacturers, Australian Avenue, London.

THE INDUSTRIAL FATIGUE RESEARCH BOARD'S seventh annual report has been issued by the Medical Research Council (H.M. Stationery Office, pp. 28, 9d.).

THE ARENDOCK DYNAMITE FACTORY, near Turnhout, Belgium, was the scene of an explosion on July 7, when six men were killed. Not much material damage was done.

PROFESSOR T. BRAILSFORD ROBERTSON has been appointed to the vacancy on the South Australian Committee of the Australian Chemical Institute caused by the death of Professor Rennie.

MR. J. W. WOOLCOCK (St. Paul's and Balliol), son of Mr. W. J. U. Woolcock, was placed in Class I in the examination for the Final Honours School of Natural Science at Oxford University.

NEGOTIATIONS WITH THE INTERNATIONAL PAPER CO. with regard to the proposed acquisition of paper-making properties were nearly complete, stated the Prime Minister of Newfoundland, on Wednesday.

MR. W. N. WATSON has been appointed chief of the Chemical Division of the United States Tariff Commission. Mr. Watson has been acting chief of the division since the resignation of C R DeLong in November last.

MR. A. M. O'BRIEN, F.I.C., M.I.CHEM.E., late general manager of the National Oil Refineries of the Anglo-Persian Oil Co., at Llandarcy, South Wales, has taken up an appointment with the Buell Combustion Co., of Astor House, Aldwych, London.

THERE ARE INDICATIONS that all space at the 1928 British Industries Fair will be booked up this year earlier than ever before, in spite of the increased space to be provided. Twenty-five per cent. of the applications, so far, have come from firms which did not exhibit last year.

FORBES, ABBOTT AND LENNARD, LTD., chemical manufacturers, of Shoreham, sued the G.W.R. Co., in the King's Bench Division, on July 7, for damage estimated at £182, done to their barge *Amy* while carrying a cargo of coal from the defendants' Chelsea basin dock. The jury found for the plaintiffs, but judgment was deferred, pending legal arguments on points of law.

APPLICATIONS ARE INVITED for the following appointments: Angas Professorship of Chemistry in the University of Adelaide, South Australia. £1,100. The Agent-General of South Australia, Australia House, 112, Strand, London. October 1.—Research Fellowships for work on textiles or any problem having a bearing on wool. The Secretary, British Research Association for the Woollen and Worsted Industries, Torridon, Headingley, Leeds.

"ACCIDENTAL DEATH" was the verdict returned by the Coroner's jury at an inquest at Halifax on Friday, July 8, upon James Bottomley, dyer's labourer, of Myrtle Road, Elland, who met his death by a portion of the roof at the works of Beaumont, Gee and Co., dyers, etc., Saddleworth Road, West Vale, Halifax, falling upon him on June 13. The jury added the opinion that the roofs of dyehouses should be periodically overhauled, because the constantly floating steam had the effect of rotting the timbers.

AN EXTRAORDINARY GENERAL MEETING of the Rayon Manufacturing Co. was held on Saturday, July 9, to consider a scheme of reconstruction and to authorise the liquidator to proceed with the registration of a new company. Sir Harry Peat, the liquidator, who presided, said the scheme might be summarised as the formation of a new company which would take over the assets and liabilities of the existing company and continue its business. Sir Sidney Skinner moved the approval of the reorganisation scheme, and the resolution was adopted, the liquidator being authorised to carry out the scheme.

UNIVERSITY NEWS.—*Oxford:* Mr. B. Lambert, M.A., fellow of Merton College, Oxford, has been appointed to be Aldrichian demonstrator of chemistry in the University for four years.—*Manchester:* The Council of Manchester University has accepted the resignation of Mr. A. G. Lobley, M.Sc., reader in electro-chemistry. Mr. Vincent Bloomer, M.Sc., has been appointed demonstrator in electro-chemistry in the Faculty of Technology, Manchester University.—*Bristol:* Mr. J. O. Jones, B.Sc., has been appointed to the position of assistant lecturer on soil chemistry at Bristol University and soil analyst at the Long Ashton research station, while Mr. V. S. Charley, B.Sc., has been appointed biochemist at the research station and assistant lecturer in biochemistry at the University.

Obituary

MR. WALLACE NICKELS, son of the late Benjamin Nickels, F.I.C., at Benfleet on July 5.

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The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

271,940. Complex Antimony Compounds, Manufacture of. W. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 1, 1926.

These compounds are obtained by treating an antimonyl compound of such polyphenols as contain two hydroxyl groups in the ortho position to each other or of a substitution product with a neutral salt of an aliphatic carboxylic acid which contains easily migratory hydrogen atoms in the molecule, or alternatively with a neutral salt of an aliphatic oxy-carboxylic acid. The former class of compounds include malonic acid, levulinic acid, diacetyl-succinic acid, and the latter class of compounds includes salts of tartaric acid and citric acid. The combination appears to take place in equi-molecular proportions, but an excess of one reagent may be necessary in order to obtain the required compounds. The neutral aqueous solutions of these compounds are precipitated by alkali sulphides but not by alkalies. Examples are given of the combination of malonic acid and antimonyl-pyrocatechin, malonic acid and antimonyl-gallic acid, levulinic acid and antimonyl-pyrocatechin, levulinic acid and antimonyl-gallic acid, tartaric acid and antimonyl-pyrocatechin. The products are employed for therapeutic purposes.

271,942. N-Dihydro-1:2:1^1:2^1-Anthraquinone-Azine, Process for the Production of. E. C. R. Marks, London. From E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, March 2, 1926.

It is known that two isomeric compounds can be obtained by fusing 2-amino-anthraquinone with caustic alkali in the presence of an oxidising agent, such as potassium nitrate or potassium chlorate. This invention is for the production of the more valuable or "A" isomer. The caustic alkali fusion of 2-amino-anthraquinone is effected in the presence of an oxidising agent such as potassium nitrate or chlorate, and also an alcoholate or phenolate of an alkali metal, the amount of the latter being less than that of the free caustic alkali. Examples are given of the use of sodium methylate and sodium butylate in this reaction, the preferred proportion being 10-12 per cent. based on the weight of fused caustic alkali employed. The temperature employed is about 220° C., and the duration of the reaction about half an hour. An increase in yield up to 20 per cent. with sodium butylate and phenolate can be obtained.

271,969. Acid Amides and Salts, Production of. Synthetic Ammonia and Nitrates, Ltd., P. A. Smith and H. G. Smith, Billingham, Stockton-on-Tees, Durham. Application date, March 13, 1926.

The amides are obtained by the reaction of alcohol vapour with hydrocyanic acid with the aid of a dehydrating catalyst at an elevated temperature, which in the case of methyl alcohol may be 250°-300° C. The reaction is facilitated by an increase of pressure. The hydrocyanic acid may be obtained by passing gases containing carbon monoxide and ammonia over a dehydrating catalyst, such as alumina or thoria, at 500°-600° C. The gaseous product contains a small proportion of hydrocyanic acid which may be extracted by cooling or by absorption in water or in the alcohol employed. It is necessary to remove the carbon monoxide completely, to avoid the formation of alkyl formates with the alcohol. The hydrocyanic acid and alcohol are then passed over alumina or thoria to obtain the amide. The latter is hydrolysed by alkali to regenerate the ammonia for use again, and to form a fatty acid salt. The hydrocyanic acid can be replaced by compounds which yield it.

272,024. Pyrazolone Dyestuffs from Amino Derivatives of 3-Carboxy-4-Hydroxy-Diphenyl Sulphide. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, and M. Mendoza, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, May 12, 1926.

Specification No. 260,058 (see The Chemical Age, Vol. XV, p. 547) describes the preparation of azo dyestuffs employing various amino derivatives of 3-carboxy-4-hydroxy-diphenyl-sulphide as first components. It is now found that the hydrazines obtained by reducing the diazo compounds of such amino derivatives may be condensed with suitable esters of β-keto-carboxylic acid to obtain pyrazolones which are good second or end components in the preparation of azo dyestuffs which are suitable as acid colours for animal fibres and chrome printing colours for cotton. The shade is practically unchanged on chroming, due to the separation of the chelate grouping from the chromophoric portion of the molecule by means of the sulphide bridge linkage. Esters such as aceto-acetic ester and oxal-acetic ester are suitable for this process. In an example, sulphanilic acid is diazotised and combined in the presence of sodium carbonate with the 3-methyl-5-pyrazolone obtained by first reducing to the corresponding hydrazine the sparingly soluble diazo compound resulting from the interaction of 2^1-amino-4-hydroxy-3-carboxy-4^1-sulphodiphenyl-sulphide with the equivalent amount of nitrous acid and then condensing the slightly alkaline solution of the hydrazine with the equivalent amount of ethyl aceto-acetate. The dyestuff is isolated by salting out, and gives a greenish-yellow shade on wool from an acid bath. Other examples are given.

272,053. Conversion of Lead Sulphate into Lead Carbonate. S. C. Smith, 701, Salisbury House, London Wall, London, E.C.2. Application date, June 29, 1926.

Specification No. 239,257 (see The Chemical Age, Vol. XIII, p. 379) describes the production of lead carbonate by passing carbon dioxide into a suspension of lead sulphate in a solution of ammonia. It is now found that to obtain the minimum proportion of lead sulphate in the product, the carbon dioxide should be passed into the solution only at such a rate as it is absorbed, *i.e.*, so that free carbon dioxide is not present in the liquid. Under these conditions, the lead carbonate contains less than 0·1 per cent. of sulphate.

271,042 and 272,433. Converting High-Boiling Hydrocarbons which have been Freed from the Substances Soluble in Liquid Sulphurous Acid, into Low-boiling Hydrocarbons by Means of Aluminium Chloride, Process for. Allgemeine Gesellschaft für Chemische Industrie m.b.H., 33, Unter den Linden, Berlin, W.8. International Convention dates, May 12 and June 19, 1926.

271,042. In the conversion of the refined products obtained by the Edeleanu process—*i.e.*, high-boiling hydrocarbons free from liquids soluble in liquid sulphurous acid, into low-boiling hydrocarbons by splitting with aluminium chloride or its double compounds, it is found that some of the hydrocarbons are split readily and others more slowly. According to this invention, if only about 2 per cent. of aluminium chloride or a double compound is employed a large proportion of the refined product is converted into low-boiling hydrocarbons, and a yield of about 50 per cent. of benzene hydrocarbons is obtained. The residue may then be treated with about 6 per cent. of aluminium chloride and heated again, so that splitting again takes place, until the whole of the residue is converted into low boiling hydrocarbons. Alternatively, the residue may be employed for obtaining Diesel engine oil, transformer oil, turbine oil, or white oil. The preliminary treatment with aluminium chloride ensures that the residue is free from products liable to decompose, and from sulphur compounds.

272,433. In the process described in Specification No. 271,042 above, it is found that if the residue obtained after treatment with a small quantity of aluminium chloride is again treated with liquid sulphurous acid, it is possible to remove the products which oppose or delay the decomposition with aluminium chloride. The residue then behaves like the primary material and the major portion can be converted by means of a small proportion of aluminium chloride into light hydrocarbons. The second residue may then be treated again in this manner. The refined products obtained according

to the Edeleanu process may thus be converted almost entirely into light hydrocarbons with only 3 to 4 per cent. of aluminium chloride.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—248,749 (I.G. Farbenindustrie Akt.-Ges.), relating to anthraquinone compounds, see Vol. XIV, p. 527 ; 260,637 (B. F. Goodrich Co.), relating to thermo-plastic derivatives of rubber, see Vol. XVI, p. 50 ; 262,456 (I. G. Farbenindustrie Akt.-Ges.), relating to purification of alkali metal cyanide solutions containing sulphides, see Vol. XVI, p. 167 ; 264,464 (I.G. Farbenindustrie Akt.-Ges.), relating to production of sodium sulphide, see Vol. XVI, p. 317.

International Specifications not yet Accepted

270,650. NITRO-CELLULOSE COMPOSITIONS. Canadian Electro Products Co., Ltd., 83, Craig Street West, Montreal, Canada. (Assignees of H. W. Matheson, 83, Craig Street West, Montreal, Canada.) International Convention date, May 4, 1926.

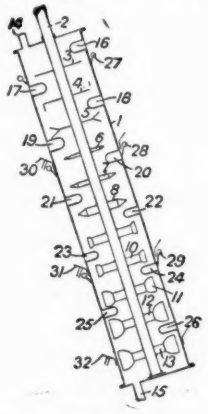
An ester of mandelic acid is employed as a plastifier in the manufacture of nitrocellulose solutions, etc. Ethyl mandelate is suitable, and a solvent such as alcohol, butyl acetate, amyl acetate, ethyl acetate, or ethyl lactate is added, together with other plastifiers such as camphor and dibutyl-phthalate if required.

270,651. BENZYL BENZOATE. Canadian Electro Products Co., Ltd., 83, Craig Street West, Montreal, Canada. (Assignees of H. W. Matheson, 83, Craig Street West, Montreal, Canada.) International Convention date, May 4, 1926.

Benzaldehyde is treated with aluminium ethoxide or butoxide, preferably in solution in an ester corresponding to the aldehyde, to obtain benzyl benzoate. Thus, the catalyst may be poured molten into ethyl acetate, and added to the benzaldehyde, the product being distilled in vacuo.

270,656. CELLULOSE ACETATE MIXING MACHINES. Soc. Chimique des Usines du Rhône, 21, Rue Jean Goujon, Paris. International Convention date, May 10, 1926.

A mixing chamber 1 employed in the acetylation of cellulose is arranged nearly vertical, and is provided with a stirrer shaft

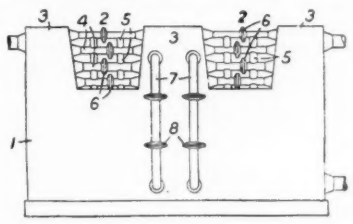


270,656

2 carrying stirrers 3, 4, 5 at the top of hook or fork form to act on the fibrous cellulose. Intermediate stirrers 6, 7, 8, for the stiffer material are of rigid rod form, and lower stirrers 10, 11, 12, 13 are in the form of paddles since the mass is then thinner. Baffles 16–26 are provided, and the temperature is controlled by jets 27–29 of heating or cooling water. Preliminary treatment with acid or alkali may be employed, and catalysts may be used in the acetylation.

270,661. SULPHURIC ACID. M. Colombo, 30, Calle de Mallorca, Barcelona, Spain. International Convention date, May 6, 1926.

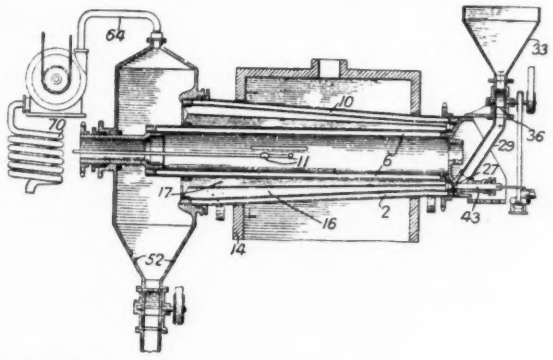
The tops of the lead chambers 1 have depressions 2 which are spanned by pipes 4 connected by cross pipes 5 opening into the top of the chamber. The pipes may be corrugated or provided with cooling fins, and may be cooled externally. Circulation of the hot gases is effected by pipes 7, 8.



270,661

270,662. ROTARY RETORTS. American Hydrocarbon Co., Inc., 115, Broadway, New York. (Assignees of K. E. Clayton-Kennedy, 115, Broadway, New York.) International Convention date, May 4, 1926.

This retort is suitable for distilling oil shale or coal, or for dehydrating broken material. Two concentric jackets 6, 10



270,662

are rotatable and contain molten metal or granular material. The material to be treated passes between the jackets. An internal burner 11 heats the inner jacket 6, and a furnace 14 heats the outer jacket 10. Ribs 16, 17, project from the two jackets into the treating chamber. The material is fed from a hopper 33 through a rotary valve 36, shoot 29, and passage 27. A plunger 43 is synchronised with the valve 36, and forces the material into the retort, where it is agitated by the ribs 16, 17. Vapour is drawn off at 64, and solid residue at 52. The inner and outer wells of the retort may be rotated independently or together.

270,313-4. CRACKING HYDROCARBONS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 1, 1926. Additions to 268,796 (see THE CHEMICAL AGE, Vol. XVI, p. 559).

270,313. In the cracking of hydrocarbons, retorts are lined with titanium, zirconium, niobium, tantalum, thorium, uranium, copper, thallium, boron, or silicon.

270,314. Oxides of metals of the third to sixth group of the periodic system, also of iron, nickel, and cobalt, are used as catalysts in the cracking of oils.

270,698. OILS FROM COAL, ETC. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 5, 1926.

Carbonaceous material is heated with mineral oil, tar, or like hydrocarbon to obtain oils.

270,704. CRACKING OILS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 7, 1926.

Hydrocarbons are cracked by passing through a heated column lined with metals, quartz, or porcelain, which do not cause deposition of carbon, and packed with catalytic materials.

D

270,705. HYDROCARBONS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 10, 1926.

Carbonyls of iron, cobalt, nickel, or molybdenum are heated in presence of hydrogen or water gas or steam to a temperature sufficient to decompose the carbonyl. The deposited metal is re-converted into carbonyl, and hydrocarbons are extracted from the gas by absorption in active silica.

LATEST NOTIFICATIONS.

273,642. Process of purifying raw lanolin. Mertens, E. July 1, 1926.

273,656. Manufacture and production of vat dyestuffs. I. G. Farbenindustrie Akt.-Ges. July 1, 1926.

273,660. Manufacture of pure lead carbonate from crude lead sulphate. Daloze, R. July 3, 1926.

273,665. Process for the manufacture of condensation products from naphthalene and naphthalene derivatives. I. G. Farbenindustrie Akt.-Ges. June 30, 1926.

273,666. Process for the production of chromates. I. G. Farbenindustrie Akt.-Ges. July 1, 1926.

273,675. Process for the distillation of coal tar. Wessel, C. June 29, 1926.

273,684. Process for the manufacture of condensation products from alkylated phenols and ketones. Chemische Fabrik auf Actien (vorm. E. Schering). June 29, 1926.

273,685. Process for the manufacture of alkylisopropyl-phenols and their hydrogenation products. Chemische Fabrik auf Actien (vorm. E. Schering). June 29, 1926.

273,686. Process for the manufacture of alkylisopropylene-phenols and alkylated cumarones. Chemische Fabrik auf Actien (vorm. E. Schering). June 29, 1926.

273,712. Manufacture and production of valuable liquid products from coal tars, mineral oils, and the like. I. G. Farbenindustrie Akt.-Ges. June 29, 1926.

273,718. Production of high per cent. nitric acid. Caro, Dr. N., and Frank, Dr. A. June 29, 1926.

273,735. Method of synthetically producing ammonia from its elements. Uhde, F. July 2, 1926.

273,757. Manufacture and production of aqueous solutions of organic compounds insoluble in water. I. G. Farbenindustrie Akt.-Ges. July 2, 1926.

273,765. Method of preparing an acid of the phthalic series, esters of the said acid, and combinations of these esters with azoic derivatives. Fodor, A. July 3, 1926.

273,774. Manufacture of α-anthra-quinonyl ketones. I. G. Farbenindustrie Akt.-Ges. July 5, 1926.

Specifications Accepted with Date of Application

246,870. Dry diazo preparations, Manufacture of. I. G. Farbenindustrie Akt.-Ges., January 30, 1925.

249,493, 251,264 and 273,228. Liquid or other hydrocarbons and derivatives thereof from coal, tars, mineral oils, and other like materials, Manufacture and production of. I. G. Farbenindustrie Akt.-Ges. April 25, 1925, and March 19, 1925.

249,549. Dyestuff preparations, Manufacture of. Soc. of Chemical Industry in Basle. March 20, 1925.

253,562. Cracking hydrocarbon oils, Process for. Chemical Research Syndicate, Ltd. June 15, 1925.

254,697. Distillation of fuel, roasting ores, and like heating purposes, Apparatus for. J. Plassmann. June 30, 1925.

255,819. Adsorption apparatus. Silica Gel Corporation. July 27, 1925.

258,846. Liquid hydrocarbons, Purification of. Allgemeine Ges. für Chemische Industrie. September 26, 1925.

261,707. Splitting fats and oils, Process for. I. G. Farbenindustrie Akt.-Ges. November 20, 1925.

262,155. Symmetrical diarylguanidines, Manufacture of. Chemische Fabrik auf Actien (vorm. E. Schering). November 30, 1925.

269,212. Diazo salts and preparations therefrom, Manufacture of. I. G. Farbenindustrie Akt.-Ges. January 19, 1925.

271,467. Acid derivatives of the α-α′-dimethyl-γ-hydroxy-piperidine-β-carboxylic acid esters. I. G. Farbenindustrie Akt.-Ges. May 17, 1926.

272,972. Non-corrodible aluminium alloys. K. Schmidt. December 22, 1925.

272,996. Cyanides, Process of and apparatus for manufacturing. O. Stalhane. March 23, 1926.

273,017. Titanium pigments, Production of. F. G. C. Stephens, L. J. Anderson, and W. A. Cash. March 26, 1926.

273,029. Artificial indiarubber, Process for the manufacture of. V. Villa. April 1, 1926.

273,043. Electrolytic desulphonation of anthraquinone sulphonic acids. British Dyestuffs Corporation, Ltd., and A. J. Hailwood. April 15, 1926.

273,045. Hydrogenation of liquids, Apparatus for. G. R. Schueler. April 16, 1926.

273,092. Steam distillation plants, Method for working. Metallbank und Metallurgische Ges. Akt.-Ges., and W. Gensecke. June 23, 1926.

273,093. Ammonium chloride crystals, Manufacture of. J. W. Moore, W. G. Polack, and Castner-Kellner Alkali Co., Ltd. June 25, 1926.

273,168. Rust proofing iron, Process for. E. C. R. Marks. (*Parker Rust-Proof Co.*). February 16, 1926.

Applications for Patents

Anderson, L. J., Cash, W. A., and Stephens, F. G. C. Production of titanium-containing pigments. 17,976. July 6.
17,976. July 6.

Bertsch, H., and Bohme Akt.-Ges., H. T. Obtaining sulphonation products from fats, etc. 18,188. July 8. (Germany, July 8, 1926.)

British Celanese, Ltd., and Haney, C. I. Manufacture of aliphatic compounds. 18,098. July 7.

British Dyestuffs Corporation, Ltd., Laurie, L. G., Linch, F. W., and Rodd, E. H. Dyeing cellulose esters, etc. 17,847. July 5.

British Dyestuffs Corporation, Ltd., and Stafford, N. Manufacture of phenolic resins. 18,055. July 7.

Caro, N., and Frank, A. R. Production of compounds of nitrogen and oxygen from ammonia. 18,106. July 7. (Germany, July 8, 1926.)

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Manufacture of tetrakisazo dyestuffs. 17,967. July 6.

Carreras, R. S. Manufacture of bismuth oxides, etc. 18,088. July 7.

Carreras, R. S. Manufacture of white lead. 18,089. July 7.

Cassel Cyanide Co., Ltd., and Ewan, T. Manufacture of carbon from carbon monoxide. 17,786. July 5.

Chemische Fabrik auf Actien, vorm. E. Schering. Manufacture of acetic acid. 18,082. July 7. (Germany, April 7.)

Coley, H. E. Manufacture of zinc. 18,041. July 7.

Coley, H. E. Manufacture of cyanides from nitrogen. 18,042. July 7.

Coley, H. E. Manufacture of alloys. 18,043. July 7.

Coley, H. E. Manufacture of photographic plates, etc. 18,044. July 7.

Coley, H. E. Manufacture of barium sulphide, etc. 18,045. July 7.

Coley, H. E. Reduction of carbonates or bicarbonates. 18,046. July 7.

Coley, H. E. Reduction of sulphates. 18,047. July 7.

Coley, H. E. Extraction of gold from arsenical ores. 18,048. July 7.

Coley, H. E. Manufacture of thorium, etc. 18,049. July 7.

Coley, H. E. Manufacture of metallic nitrides, etc. 18,050. July 7.

Dreyfus, H. Manufacture of aliphatic compounds. 18,098. July 7.

Durand et Huguenin Soc. Anon. Dyeing or printing. 18,067. July 7. (Germany, July 10, 1926.)

Fodor, A. Preparing acid of phthalic series, etc. 17,708. July 4. (Belgium, July 3, 1926.)

Hadfield, Sir R. A. Manufacture of hollow metal rods, etc. 18,056. July 7.

Hall, A. J., and Silver Springs Bleaching and Dyeing Co., Ltd. Process for treating viscose silk, etc. 18,274. July 9.

Hoffmann-La Roche and Co. Akt.-Ges., F. Manufacture of alkyl and aralkyl derivatives of diphenolisatine. 18,150. July 8. (Switzerland, October 9, 1926.)

Höganäs-Billesholms Aktiebolag and Nordiske Natrolith Aktieselskabet. Method of softening, etc., water. 17,895. July 6. (Sweden, October 29, 1926.)

Hufschmidt, C. Water-softening filters, etc. 17,840. July 5.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Ammonium phosphates. 17,717. July 4.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of vat dyestuffs. 18,074. July 7.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of synthetic organic compounds. 18,075. July 7.

I. G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Manufacture of sulphamic acids of secondary bases. 18,199. July 8.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of ointments, etc. 18,317. July 9.

I. G. Farbenindustrie Akt.-Ges. Manufacture of α-anthraquinonyl ketones. 17,864. July 5. (Germany, July 5, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of cyclic ketones. 18,068. July 7. (Germany, July 8, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of naphthalene-1 : 4 : 5 : 8-tetracarboxylic acid. 18,184. July 8. (Germany, July 9, 1926.)

Imperial Chemical Industries, Ltd., and McEntegart, J. M. Explosives. 17,761. July 4.

Imperial Chemical Industries, Ltd. Production of gaseous fuels. 18,140. July 8.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton for home market, 1-cwt. drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—8d. to 9d. per lb. Crude 60's, 2s. 4d. to 2s. 8d. per gall.

ACID CRESYLIC 99/100.—2s. 8d. to 2s. 9d. per gall. 97/99.—2s. 1½d. to 2s. 4½d. per gall. Pale, 95%, 2s. to 2s. 3d. per gall. Dark, 1s. 9d. to 2s. 1d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 11d. to 1s. per gall., ex works in tank wagons. Standard Motor, 1s. 9d. to 2s. 2d. per gall., ex works in tank wagons. Pure, 1s. 7d. to 2s. 6d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 8d. to 1s. 10½d. per gall. Firm. Pure, 2s. to 2s. 3½d. per gall.

XYLOL.—2s. to 2s. 4d. per gall. Pure, 2s. 6d. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 8¾d.; middle oil, 7⅜d. to 7⅞d. per gall. Heavy, 8⅜d. to 8¾d. per gall. Salty, 7d. per gall. less 1½%.

NAPHTHA.—Crude, 7½d. to 8d. per gall. according to quality. Solvent 90/160, 1s. 2d. to 1s. 6d. per gall. Solvent 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £7 10s. per ton. Whizzed or hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £11 10s. to £13 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 82s. 6d. to 85s. per ton, f.o.b., according to district; nominal.

PYRIDINE.—90/140, 7s. 6d. to 13s. per gall. Nominal. 90/180, 4s. 6d. to 5s. per gall. Heavy, 5s. to 8s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—4s. 9d. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7½d. per lb. naked at works.

ANILINE SALTS.—7½d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4½d. per lb. Fair inquiry.

m-CRESOL 98/100%.—3s. per lb. Only limited inquiry.

p-CRESOL 32/34° C.—2s. 8½d. per lb. Only limited inquiry.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 2d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—7½d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9 5s. per ton. Grey, £15 10s. per ton. Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£6 15s. to £10 per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10d. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 9d. to 4s. per gall., 60% O.P. Solvent, 3s. 11d. to 4s. 3d. per gall., 40% O.P.

WOOD TAR.—£4 to £5 10s. per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£40 15s. to £41 10s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.

ZINC SULPHIDE.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 6d. per lb.

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. to 1s. 3d. per oz., according to quantity.

ACID, BORIC B.P.—5 cwt. lots Crystal, 41s. per cwt.; powder, 45s. per cwt. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 7¾d. to 1s. 10d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.

ACID, SALICYLIC, B.P.—1s. 3½d. to 1s. 6d. per lb.; Technical.—11¾d. to 1s. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 3¾d. per lb., less 5%. Firm market.

AMIDOL.—9s. per lb., d/d.

ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—8s 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: 1s. per lb.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—6s. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—9s. 9d. to 10s. per lb.

BISMUTH CITRATE.—9s. 6d. to 9s. 9d. per lb.

BISMUTH SALICYLATE.—8s. 9d. to 9s. per lb.

BISMUTH SUBNITRATE.—7s. 9d. to 8s. per lb.

BISMUTH NITRATE.—5s. 9d. to 6s. per lb.

BISMUTH OXIDE.—13s. 9d. to 14s. per lb.

BISMUTH SUBCHLORIDE.—11s. 9d. to 12s. per lb.

BISMUTH SUBGALLATE.—7s. 9d. to 8s. per lb. Extra and reduced prices for smaller and larger quantities respectively; Liquor Bismuthi B.P. in W. Qts. 1s. 1d. per lb.; 12 W. Qts. 1s. per lb.; 36 W. Qts. 11½d. per lb.

BORAX B.P.—5 cwt. lots, Crystal, 25s. per cwt.; powder, 27s. per cwt. according to quantity. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 11d. per lb.; sodium, 2s. 4d. per lb.; ammonium, 2s. 4d. per lb., all spot.

CALCIUM LACTATE.—1s. 3½d.

CHLORAL HYDRATE.—3s. 6d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—Prices for Winchester quarts; dozen Winchester quarts; carboys or drums; and 10 cwt. lots respectively: '730—1s. 2½d.; 1s. 2d.; 1s. 1½d.; 1s. 0½d.; '720 technical—1s. 5½d.; 1s. 5d.; 1s. 4½d.; 1s. 3½d.; '720 pur. (Aether B.P., 1914)—2s. 4d.; 2s. 3½d.; 2s. 3d.; 2s. 2d.

FORMALDEHYDE.—£39 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—5s. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 1 lb., 16s. per doz.; ½ lb., 9s. 6d. per doz.; ¼ lb., 6s. 6d. per doz.

HYDROQUINONE.—2s. 11d. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.

IRON PERCHLORIDE.—4d. per lb., 22s. per cwt.

MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy Commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.

MENTHOL.—A.B.R. recrystallised B.P., 18s. 6d. per lb. net; Synthetic detached crystals, 11s. 6d. to 14s. 6d. per lb., according to quantity; Liquid (95%), 12s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s. 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10d. to 5s. 11d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 9d. per lb.

METHYL SULPHONAL.—9s. 6d. to 9s. 9d. per lb.

METOL.—11s. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—2s. 9d. to 3s. per lb.

PHENAZONE.—4s. 3d. to 4s. 6d. per lb.

PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—100s. per cwt. less 2½% for ton lots.

POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot.

QUININE SULPHATE.—2s. per oz., 1s. 8d. for 1000 oz. lots in 100 oz. tins.

RESORCIN.—3s. 9d. to 4s. per lb., spot.

SACCHARIN.—55s. per lb.; in quantity lower.

SALOL.—2s. 4d. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923—2s. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—92s. 6d. to 97s. 6d. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—6s. 6d. to 6s. 9d. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. to 2s. 2d. per lb.

THYMOL.—Puriss., 10s. 6d. to 10s. 9d. per lb., according to quantity. Firmer. Natural, 15s. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.

AUBEPINE (EX ANETHOL), 10s. 6d. per lb.

AMYL ACETATE.—2s. per lb.

AMYL BUTYRATE.—5s. 3d. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL BENZOATE.—2s. 6d. per lb.

CINNAMIC ALDEHYDE NATURAL.—17s. per lb.

COUMARIN.—10s. per lb.

CITRONELLOL.—14s. 6d. per lb.

CITRAL.—8s. 6d. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—9s. per lb.

GERANIOL (PALMAROSA).—18s. 6d. per lb.

GERANIOL.—6s. 6d. to 10s. per lb.

HELIOTROPINE.—4s. 9d. per lb.

ISO EUGENOL.—13s. 6d. per lb.

LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 18s. 6d. per lb. Ex Shui Oil, 14s. 6d. per lb.

METHYL ANTHRANILATE.—8s. 6d. per lb.

METHYL BENZOATE.—4s. per lb.

MUSK KETONE.—35s. per lb.

MUSK XYLOL.—8s. 6d. per lb.

NEROLIN.—4s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. 6d. per lb.

PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.

RHODINOL.—32s. 6d. per lb.

SAFROL.—1s. 6d. per lb.

TERPINEOL.—1s. 8d. per lb.

VANILLIN.—17s. to 18s. per lb.

Essential Oils

ALMOND OIL.—10s. 3d. per lb.

ANISE OIL.—3s. per lb.

BERGAMOT OIL.—28s. per lb.

BOURBON GERANIUM OIL.—14s. 9d. per lb.

CAMPHOR OIL.—70s. per cwt.

CANANGA OIL, JAVA.—26s. per lb.

CINNAMON OIL LEAF.—6d. per oz.

CASSIA OIL, 80/85%.—8s. 3d. per lb.

CITRONELLA OIL.—Java, 85/90%, 1s. 11d. per lb. Ceylon, pure, 1s. 9d. per lb.

CLOVE OIL.—6s. per lb.

EUCALYPTUS OIL, 75/80 %.—2s. 3d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 22s. 6d. per lb.

LEMON OIL.—8s. per lb.

LEMONGRASS OIL.—4s. 6d. per lb.

ORANGE OIL, SWEET.—10s. 6d. per lb.

OTTO OF ROSE OIL.—Anatolian, 30s. per oz. Bulgarian, 70s. per oz.

PALMA ROSA OIL.—10s. 6d. per lb.

PEPPERMINT OIL.—Wayne County, 18s. per lb. Japanese, 8s. per lb.

PETITGRAIN OIL.—7s. 9d. per lb.

SANDALWOOD OIL.—Mysore, 26s. 6d. per lb.; 90/95%, 16s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, July 14, 1927.

BUSINESS has been rather quiet this week, owing to the stock-taking period.

General Chemicals

ACETONE is unchanged.
ACID ACETIC.—The market is fair at £37 to £38 for 80% grades.
ACID CITRIC is a fair market at 1s. 8d. per lb., less 5%.
ACID FORMIC.—Demand is slightly better; price about £47 per ton for 85%.
ACID LACTIC.—A fair amount of business is passing and the price is firm at £42 per ton for 50% by weight.
ACID OXALIC.—Price unchanged at £28 to £30 per ton; demand still rather dull.
ACID TARTARIC is in better demand; price firm at 1s. 4d. per lb. less 5%.
ALUMINA SULPHATE is in good demand at £5 10s. per ton for 17-18%.
AMMONIUM CHLORIDE.—Demand is improving at about £19 per ton for fine white 98-100%.
ARSENIC is unchanged.
BARIUM CHLORIDE is still in small demand at £9 per ton for spot.
COPPER SULPHATE is unchanged.
CREAM OF TARTAR is still slow of sale but the price is maintained at £100 per ton.
EPSOM SALTS is unchanged.
FORMALDEHYDE is still in good demand at £40 to £41 per ton spot.
LEAD ACETATE.—Demand is maintained at about £43 per ton for white and about £1 per ton less for brown.
LEAD NITRATE is unchanged at £39 per ton.
METHYL ACETONE is firm and in good request; the price for spot delivery is about £60 per ton.
POTASSIUM CHLORATE is unchanged.
POTASSIUM PERMANGANATE is firm at about 7½d. per lb.
POTASSIUM PRUSSIATE is unchanged.
SODA ACETATE is slightly easier at £18 10s. to £18 15s. per ton.
SODA BICHROMATE.—Unchanged.
SODA CHLORATE.—Unchanged.
SODIUM HYPOSULPHITE.—Unchanged.
SODIUM NITRITE.—Demand is a little better at £20 per ton.
SODIUM PHOSPHATE continues in good demand at £12 per ton.
SODIUM PRUSSIATE.—Price is slightly easier and demand is fair.
SODIUM SULPHIDE is in a little better demand, price unchanged.
ZINC SULPHATE.—Unchanged.

Coal Tar Products

The market values of coal tar products continue practically unchanged, and there is little business passing.

90's BENZOL.—There is very little demand, and it is quoted at 1s. 2½d. to 1s. 3d. per gallon on rails, while the motor quality can be bought at 1s. 2d. per gallon.
PURE BENZOL is worth about 1s. 8d. to 1s. 9d. per gallon on rails.
CREOSOTE OIL is firmer for spot delivery, the price on rails in the North being 7¼d. per gallon, while the price in London is 8¾d. to 9d. per gallon.
CRESYLIC ACID remains firm, and the pale quality, 97/99%, is very scarce for prompt delivery. It is quoted at 2s. 3d. to 2s. 4d. per gallon on rails, while the dark quality, 95/97%, is worth about 1s. 10d. per gallon.
SOLVENT NAPHTHA is very quiet, and there is little business passing. It is worth about 10½d. to 11d. per gallon on rails.
HEAVY NAPHTHA is also very quiet, and the price remains unchanged at 11d. per gallon on rails.
NAPHTHALENES.—There is a continued demand for all qualities. For the 74/76 quality, prices tend to become firmer at about £6 10s. to £6 15s. per ton, while the 76/78 quality is still quoted at about £8 to £8 10s. per ton, but supplies are short for the near position.
PITCH.—There is little news to report and few transactions have been reported. The value is more or less nominal at 80s. to 85s. per ton, f.o.b. U.K. ports.

Latest Oil Prices

LONDON, July 13.—LINSEED OIL steady and occasionally 2s. 6d. higher. Spot, ex mill, £32 10s.; July, £31 10s.; August, £31 12s. 6d.; September-December, £32 2s. 6d. RAPE OIL inactive. Crude, extracted, £43; technical, refined, £45, naked, ex wharf. COTTON OIL quiet. Refined common edible, £41 10s.; Egyptian, crude, £35 10s.; and deodorised, £43 10s. TURPENTINE firm, and 9d. to 1s. 3d. per cwt. higher. American, spot, 38s. 3d.; August, 38s. 6d.; September-December, 40s. 3d. per cwt.

HULL, July 13.—LINSEED OIL.—Naked, spot to December £32 10s. COTTON OIL.—Naked Egyptian crude, £34 5s.; edible refined, £38 5s.; technical, £37 10s.; deodorised, £40 5s. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £37 10s. GROUNDNUT OIL.—Crushed/extracted, £43; deodorised, £47. SOYA OIL.—Extracted and crushed, £33; deodorised, £36 10s. RAPE OIL.—Crude/extracted, £43; refined, £45 per ton net cash terms ex mill. CASTOR OIL and COD OIL unchanged.

Nitrogen Products

Export.—The market for sulphate of ammonia has been steady for the last week. Prices for large lots continue on the basis of £9 2s. 6d. per ton, f.o.b. U.K. port. It is understood that purchases have been on a very large scale and producers' stocks in all countries are now very low. It appears that the market has touched bottom and that any variation in the near future will tend to be upward.

Home.—The home market is particularly slack and uninteresting as British producers continue to sell at last year's price scale. They have announced that there will be a reduction for August delivery.

Nitrate of Soda.—The nitrate market continues steady at about 10s. 7d. per metric quintal f.a.s. Chile, but the volume of sales is smaller than for June. Production continues to show a slight increase. Nitrate producers continue optimistic and a further increase is expected.

Static Friction Tests of Lubrication Value

THE property of oiliness and lubricating value of oils shows itself very clearly when two metallic lubricated surfaces are in actual contact, and valuable results may be obtained by measuring the static frictional coefficients of oils between different metals. The utility of a machine constructed for this purpose depends on the fact that when two lubricated surfaces are at rest and in close contact, the static friction or force required to cause movement depends upon the relative slipperiness of the surfaces. The Deeley Friction Machine for testing oils, manufactured by J. H. Stewart, Ltd., of 406, Strand, London, is such an apparatus. It may be used for determining the lubricating values, etc., of oils; for investigating the chemical changes which occur on metallic and other surfaces by observing the change in oiliness of the surface; and for other purposes which will obviously come to mind.

Viscount Chetwynd's Inventions

WAR-TIME inventions by Viscount Chetwynd, used in the making of explosives, formed the subject of a claim for an award which came before the Royal Commission on Awards to Inventors, sitting in London on Monday. The claim was in respect of improvements in the manufacture of amatol and in the filling of high-explosive shells. Mr. J. Whitehead, K.C., who appeared for Viscount Chetwynd, said the inventions were eight in number. Viscount Chetwynd was manager of the National Filling Factory at Chilwell, and the inventions were first used there, although subsequently they were used throughout the land. The inventions related to the filling of shells with amatol by direct pressure and by the melting method to the exploder container, to the closing plug, and to other devices. The hearing was adjourned.

This Week's City Tour

ON Wednesday, the fourth of the series of tours arranged for readers of their journals by Benn Brothers, Ltd., publishers of THE CHEMICAL AGE, took place. The Royal Courts of Justice were first visited, the party then proceeding to the Record Office Museum. Here the Domesday Book, the log of the Victory, and other interesting relics were inspected. Finally a visit was paid to the Chapel and Great Hall of Lincoln's Inn. At the conclusion of the tour, the staff dining room at Bouverie House provided tea for the visitors. On Tuesday, July 19, the fifth of the series of tours will be made to the Priory Church of St. Bartholomew, Smithfield (Twelfth century), and St. Bartholomew's Hospital.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, July 13, 1927.

BUSINESS in the heavy chemical market still remains quiet, and with holidays commencing at the end of this week there is not much prospect of any improvement within the next fortnight. Prices remain on about the same level.

Industrial Chemicals

ACID ACETIC.—98/100%, £55 to £67 per ton, according to quantity and packing, c.i.f. U.K. ports; 80%, pure, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Now quoted 8d. per lb., f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—In moderate demand, but price advanced slightly. Now quoted 1s. 7d. per lb., less 5%, ex store, for English material. Continental higher at 1s. 8d. per lb., less 5%, c.i.f. U.K. ports.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC.—Still in good demand, and price unchanged at 3d. per lb., ex store, spot delivery. Offered from the Continent at 2¾d. per lb., ex wharf.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Advanced to about 1s. 4d. per lb., less 5%, ex wharf, still in good demand.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material quoted £5 12s. 6d. per ton, ex store. On offer for early delivery at £5 5s. per ton, c.i.f. U.K. ports.

ALUM POTASH.—Lump quality on offer from the Continent at £8 2s. 6d. per ton, c.i.f. U.K. ports; powdered, 2s. 6d. per ton less. Lump on spot on offer at £9 2s. 6d. per ton, ex store.

AMMONIA ANHYDROUS.—Unchanged at about 9d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture quoted £23 to £24 per ton, ex station. Continental material on offer at about £19 15s. per ton, c.i.f. U.K. ports; fine white crystals quoted £18 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Spot material unchanged at about £18 15s. per ton, ex store. Offered for prompt despatch from mines at £17 10s. per ton, ex wharf.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £7 2s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4-ton lots. Spot material, 10s. per ton extra. Continental on offer at £7 10s. per ton, ex wharf.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 to £5 5s. per ton, ex station, with a slight concession for contracts. Continental quoted £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports for export.

COPPER, SULPHATE.—Continental material unchanged at about £24 per ton, ex wharf. British material now quoted £24 per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Unchanged at £38 per ton, c.i.f. U.K. ports; spot material quoted £39 5s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material unchanged at £31 15s. per ton, ex store.

LEAD, WHITE.—Quoted £32 5s. per ton, ex store.

LEAD ACETATE.—White crystals offered from the Continent at £42 7s. 6d. per ton, c.i.f. U.K. ports; brown, about £40 5s. per ton, c.i.f U.K. ports; white crystals offered on spot at about £43 15s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

POTASH CAUSTIC, 88/92%.—Solid quality quoted £28 15s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Under 15-ton lots, £29 10s. per ton; liquid, £15 per ton, minimum 15-ton lots. Under 15-ton lots, £15 7s. 6d. per ton, c.i.f. U.K. ports.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £27 5s. per ton, ex wharf, early shipment. Spot material on offer at about £28 10s. per ton, ex store.

POTASSIUM CHLORATE.—Powdered quality on offer at £24 5s. per ton, c.i.f. U.K. ports. Crystals, £2 per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 12s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £21 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6½d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Rather easier at about 7¼d. per lb., ex store, spot delivery. Offered for prompt shipment at a fraction less.

SODA CAUSTIC.—Powder, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton, and 70/72%, £14 10s. per ton, carriage paid, station, minimum 4-ton lots on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 per ton, ex store. Continental rather higher at about £17 17s. 6d. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined, recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 10s. per ton, ex store, minimum 4-ton lots. Continental on offer at about £8 2s. 6d. per ton, ex wharf, prompt shipment. Pea crystals of British manufacture quoted £15 5s. per ton, ex station, 4-ton lots.

SODIUM NITRITE, 100%.—Quoted £19 15s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 4¼d. per lb., ex wharf, spot material on offer at 4½d. per lb., ex store.

SODIUM, SULPHATE (SALTCAKE).—Price for home consumption £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—Prices for English material as follows: 60/62%, solid, now £10 10s. per ton; broken, £11 10s. per ton; flake, £13 5s. per ton; crystals, 31/34%, £7 10s. per ton to £8 5s. per ton according to quality delivered your works, minimum 4-ton lots on contract. Prices for spot delivery, 5s. per ton higher for solid, 2s. 6d. per ton for crystals. Offered from the Continent at about £9 5s. per ton c.i.f. U.K. ports; broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 per ton; rock, £11 per ton; floristella, £10 per ton; ground American, £9 5s. per ton, ex store, prices nominal.

ZINC, CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC, SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

THE SCIENCE LIBRARY, at the Science Museum, South Kensington, London, is extending its facilities for lending books and periodicals. The books will be available for loan to approved institutions where scientific or technical work is being carried on.

THE EXTENDED USAGE of various belt and chain safety appliances would appear to be worthy of the consideration of manufacturers and power users generally, for during the past year, according to a factory inspector's report, injury was caused to 226 dye and bleach, 153 chemical, 181 pottery, 109 oil and soap, and 456 clay, stone and quarry workers, by falling or contact with power drives.

THE SPANISH MINISTRY OF AGRICULTURE has inaugurated a fleet of twenty-one laboratory cars in which professors of agriculture will tour the country districts with the object of instructing the farmers and peasants in the latest and best agricultural methods. The cars are fitted up as laboratories in order that samples of olive oil, wine, milk, and water may be analysed and reported upon. They are also carrying kinematograph apparatus for purposes of demonstration.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, July 14, 1927.

The slight promise of improved conditions which has been in evidence on the Manchester chemical market during the past week or two, if it has not faded out, has, at all events, not developed, and business since last report has only been on a comparatively moderate scale, although the principal heavy products continue to move off in fair quantities. With regard to prices, there is some easiness in one or two lines, but, on the whole, the market keeps steady.

Heavy Chemicals

In the case of bichromate of soda a quiet trade has been reported and values have been maintained, about 3d. per lb. being quoted. There is no change in the position of prussiate of soda, offers of which range from 4½d. to 4¼d. per lb. Nitrite of soda meets with a fair demand and prices are held at up to £19 5s. per ton. Bleaching powder is moving off in moderate quantities, and for home consumption purposes makers continue to quote at £8 per ton. Alkali continues firm at about £6 15s. per ton and a quietly steady trade is being put through. Offers of saltcake are at from £3 10s. to £3 15s. per ton, without attracting a great deal of attention from buyers. Caustic soda meets with a fair amount of inquiry, and prices are firm at from £14 10s. to £16 10s. per ton, according to quality. As regards chlorate of soda, the demand for this is slow, and values, if anything, are easy, although about 2¾d. per lb. is still being quoted. Phosphate of soda continues rather quiet, but prices are maintained at round £12 15s. per ton. Sulphide of soda is fairly steady, but buying interest in this material is restricted; for 60-65 per cent. concentrated solid current values are round £11 5s. per ton, with the commercial product on offer at £8 10s. Bicarbonate of soda is well held at £10 10s. per ton, and a fair demand for this has been reported. Glauber salts remain rather dull, with up to £3 10s. per ton being quoted this week. Hyposulphite of soda is in quiet request, with photographic offering at from £16 to £16 5s. per ton and commercial at about £9 10s.

Among the potash compounds, prussiate, although not quotably changed since last week, is still easy at about 6⅝d. per lb., with the demand on quiet lines. Chlorate of potash is also a slow section of the market, and current quotations for this are now no better than about 3¼d. per lb. Caustic potash, however, continues to attract a fair volume of buying interest and values are steady at up to £31 per ton. Carbonate of potash, also, is well held at round £27 5s. per ton and the demand is on a moderate scale. Bichromate of potash is steady and in fair inquiry at 4¼d. to 4¼d. per lb. There has been little change in the position of permanganate of potash, prices keeping steady although the demand is still on the slow side; the B.P. quality is quoted at 6½d., and the commercial at 5¼d. to 5½d. per lb.

A quiet trade is being put through in arsenic, and values seem to have steadied up a little, with white powdered, Cornish makes, quoted at about £15 5s. per ton at the mines. Up to £25 15s. per ton, f.o.b., is now being quoted for sulphate of copper, the export inquiry for which continues on a fair scale. Nitrate of lead is in quiet demand, with current offers at round £38 5s. per ton. Acetate of lead still has an easy tendency, and the demand for this is by no means active; white is quoted at £43 and brown at £40 to £40 10s. per ton. Acetate of lime remains fairly steady, with grey material offered at about £15 10s. and brown at £8 7s. 6d.

Acids and Tar Products

In oxalic acid a quiet trade is being done and prices are steady at round 3d. per lb. Citric acid is not a particularly good seller, but prices are firm at 1s. 6¾d. to 1s. 7d. per lb. Tartaric acid is also well held at about 1s. 3¼d. per lb. As regards acetic acid, this is moving off in fair quantities at steady prices, about £37 per ton being quoted for the 80 per cent. commercial grade and £66 to £67 for the glacial.

Creosote oil and pitch are still the most interesting sections of the market for coal-tar products. Short supplies, combined with a fair inquiry in each instance, serve to maintain values at firm levels, creosote being quoted at 7½d. to 7⅝d. per gallon, and pitch at up to £4 5s. per ton. Solvent naphtha remains dull and easy at about 1s. 1d. per gallon. There is not much activity in carbolic acid, but prices are steady at 2s. 5d. per gallon for crude and 8d. to 8¼d. per lb. for crystals.

Report of the Fuel Research Board

The Department of Scientific and Industrial Research has issued the *Report of the Fuel Research Board for the Year* 1926 (H.M. Stationery Office, pp. 62, 1s. 3d.), with which is included the report of the Director of Fuel Research. Particular interest attaches to the intermediate scale tests which are being conducted into the Bergius system of hydrogenation of coal. Many engineering difficulties have been surmounted, and investigation is being made of the type of coal most suitable. Preliminary investigations are also being carried on as regards the production of synthetic alcohols and hydrocarbons from water gas. Work has been continued on low-temperature carbonisation, and while an advanced stage has been reached, it is indicated that none of the processes have reached the point where audited figures can be produced to show a normal profit under working conditions. The process worked out by the Fuel Research Station is to be tried out on a 100 ton-a-day plant by the Fuel Production Co. (a subsidiary of the Gas Light and Coke Co.). The inquiry and research of the Fuel Research Division on the production of power alcohol has given no indication that it could be made from waste materials in this country at a price comparable to that of petrol. The work at Holton Health on the production of power alcohol, in view of this and other considerations, has been discontinued since March 31.

Winding Up of Woolulose Holdings

The statutory first meeting of creditors and contributories of the Woolulose Holdings and Investment Co., Ltd., which was registered in October, 1925, was held in London on July 6, at the offices of the Official Receiver. A petition for the compulsory winding up of the firm was made on May 24 by Harold Saunders, Ltd., of Birmingham. The statement of affairs showed unsecured liabilities £871, debenture claims £1,174, and assets a bank balance of 4d. and a book debt of £531. According to statements by Mr. R. G. Harley, a director, the company was formed by Colonel E. A. Eaton and the directors of Woolene, Ltd., to acquire the share and debenture capital of the company, and to provide it with sufficient working capital to produce a wool substitute by a process, the formulæ of which had been secured by Woolene, Ltd., in 1921, but which had not been exploited. Colonel Eaton was appointed the company's advisory engineer, and was to be responsible for all office arrangements. On October 20, 1925, a prospectus was issued, offering 179,300 shares, tax free, at 4s. a share, or a premium of 3 per cent. a share. The result of the issue was a failure, and the agreements entered into with Woolene, Ltd., were never carried into effect. In the absence of a quorum, the meetings were formally adjourned, and the liquidation will remain in the hands of the Official Receiver.

International Holdings Co.

The secretary of the International Holdings and Investment Co. (of which Captain Alfred Loewenstein is chairman) has issued a statement to the effect that the attention of the board has been called to various statements referring to the company, made by Dr. Henri Dreyfus and Colonel Bristow at the extraordinary general meeting of shareholders of British Celanese, Ltd., held on June 30. According to the statement, legal actions are pending, to which Dr. Dreyfus and the International Holdings and Investment Co. are parties, and at which the true position will emerge. In the meantime, the board of the International Holdings and Investment Co. deny categorically the accuracy of the said statements.

Canadian National Research Laboratories

With a view to Canada's natural resources being developed to the fullest possible extent and the waste products of industry being utilised, the Dominion Government has decided to establish, at Ottawa, national research laboratories, which will undertake standardisation work of all kinds as at the Bureau of Standards, Washington, and the National Physical Laboratory in England, and in which provision will be made for the carrying out of research by private firms. The aim of the Government is to co-ordinate all the interests now engaged in industrial and scientific research.

Company News

TARMAC, LTD.—An interim dividend of 2 per cent., less tax, is announced, payable on and after August 8.

JOHN KNIGHT.—The directors announce a dividend of 12½ per cent. (actual) on the preferred ordinary shares for the past half year.

CELANESE CORPORATION OF AMERICA.—A dividend of 7 per cent. has been declared on the cumulative first participating preferred stock, thus clearing off all arrears.

ELECTROLYTIC ZINC OF AUSTRALASIA.—Dividends at the rate of 12 per cent. per annum are announced for the six months ended June 30 on both the preference and the ordinary shares.

COURTAULDS, LTD.—An interim dividend on the ordinary share capital of 1s. 6d., free of income tax, will be paid on July 29, to shareholders on the books of the company at the close of business on July 7.

NOBEL INDUSTRIES, LTD.—For the year ended December 31 last the profit amounted to £1,469,141. After providing for debenture interest, and writing off one-thirtieth of the cost of debenture issue, the net balance is £1,395,775, and £230,527 brought in makes an available total of £1,626,302. The dividend for the year on the ordinary shares is 15 per cent., and on the deferred 10 per cent., both less tax, compared with 10 per cent. and 5 per cent. respectively paid for the preceding year, leaving a balance of £233,390 to be carried forward.

W. AND T. AVERY, LTD.—After making the usual provision for depreciation, taxation, etc., and including £47,259 brought forward from last year, the balance of revenue account for the year ended March 31 last is £137,592. The interest on debenture stock absorbs £4,181, and after allowing for the year's preference dividend, the directors recommend a final dividend on the ordinary shares of 10 per cent. (less income tax), making, with the interim dividend, 15 per cent. for the year, placing to reserve £15,000, and carrying forward £52,451.

STANDARD CHEMICAL CO., LTD.—At a meeting of the shareholders, held in London, on July 7, resolutions were unanimously passed approving a scheme of reconstruction put forward by the directors. Under the new scheme, which was under the direction of the Canadian Court, each share of preferred stock would be converted into one share of no par value, while every ten shares of common stock would be converted into one share of no par value, thus making only one class of share in future. The holders of preferred stock would receive 96⅔ per cent. of the whole, and the holders of the common stock 3⅓ per cent. The arrears of dividend on the preferred stock now approximating $3,150,000 would, it was stated, be eliminated if the scheme was adopted. Had the scheme been in force last year the profits would have approximated $130,000, or nearly $3½ per converted share.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICAL LINES, SCIENTIFIC INSTRUMENTS, PAINTS, ENAMELS AND VARNISHES, ETC.—An Australian business man at present visiting this country desires to get into touch with manufacturers. Replies to the Official Secretary, Commercial Bureau, Australia House, Strand, London, W.C.2. (Reference No. 469.)

RED OXIDE PAINT IN PASTE.—The South African Railways and Harbours Administration is inviting tenders, to be presented by noon on Thursday, August 25, 1927. (Reference B.X. 3,627.)

SMELTED ALUMINIUM AND NICKEL.—A firm in Vienna desires to secure the representation, on a commission basis, of British manufacturers or exporters. (Reference No. 29).

MANGANESE ORE.—A firm established at Antwerp is desirous of obtaining the representation of British exporters. (Reference No. 30.)

CAUSTIC SODA.—A firm of agents established in Athens desire to obtain the representation for Greece of British manufacturers. (Reference No. 35.)

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Gee & Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to August 6, 1927:

"ETHOL."

478,061. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Class 1. Ethyl Gasoline Corporation (a Corporation organised and existing under the laws of the State of Delaware, United States of America), 7, West 10th Street, Wilmington, Delaware, Dayton, Ohio, United States of America; and 25, Broadway, New York, State of New York, United States of America; manufacturers and merchants. February 21, 1927. (To be Associated. Sect. 24.) Address for service in the United Kingdom is c/o D. Young and Co., 11 and 12, Southampton Buildings, London, W.C.2.

"MOLDICIDE."

480,692. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Borax Consolidated, Ltd., 16, Eastcheap, London, E.C.3; manufacturers of borax, boracic acid and boron products. May 16, 1927. (To be Associated. Sect. 24.)

"ESSOGEN."

477,726. Class 3. Vitamin concentrates for use in medicine and pharmacy. Lever Brothers, Ltd., Port Sunlight, Cheshire; manufacturers. February 11, 1927. (To be Associated. Sect. 24.)

"STIBOSAN."

480,576. Chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. May 12, 1927.

"CHOLUMBRIN."

481,225. Chemical substances prepared for use in medicine and pharmacy. Boot's Pure Drug Co., Ltd., 37, Station Street, Nottingham; merchants. June 2, 1927.

"ORARSAN."

481,226. Chemical substances prepared for use in medicine and pharmacy. Boot's Pure Drug Co., Ltd., 37, Station Street, Nottingham; merchants. June 2, 1927.

"RADIOSTOLEUM."

481,280. Chemical substances prepared for use in medicine and pharmacy. The British Drug Houses, Ltd., 16 to 30, Graham Street, City Road, London, N.1; wholesale druggists. June 7, 1927. (To be Associated. Sect. 24.)

"ANTIMOSAN."

481,435. Chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. June 10, 1927.

"CRESTALLINE."

479,738. Raw, or partly prepared, vegetable, animal and mineral substances used in manufactures, not included in other Classes, but not including soaps for use in the manufacture of leather or mineral substances used in the manufacture of abrasives and refractories, and not including any goods of a like kind to any of these excluded goods. Greenhill and Sons, Ltd., Pontifex House, Shoe Lane, London, E.C.4; manufacturers. April 12, 1927. (To be Associated. Sect. 24.)

"ETHOL."

478,064. Raw, or partly prepared, vegetable, animal and mineral substances used in manufactures, not included in other Classes. Ethyl Gasoline Corporation (a Corporation organised and existing under the laws of the State of Delaware, United States of America,) 7, West 10th Street, Wilmington, Delaware, Dayton, Ohio, United States of America; and 25, Broadway, New York, State of New York, United States of America; manufacturers and merchants. February 21, 1927. (To be Associated. Sect. 24.) Address for service in the United Kingdom is c/o D. Young and Co., 11–12, Southampton Buildings, London, W.C.2.

201/3/89

COMBATING CORROSION

When you plan to put in new plant—whatever it may be—a mixer—an evaporating pan — any form of chemical equipment—corrosion will occupy a prominent, if not the most important, place in your calculation.

FIRTH "STAYBRITE"

Here, there, and everywhere in the minds of chemical engineers FIRTH STAYBRITE is eliminating the calculations, the doubts as to the useful life of plant—just because in so many cases it does away once and for all with the bogey of corrosion. No metal can substantiate the claim to a longer or more useful list of acids, alkalies or conditions against which it is immune from corrosive attack.

FIRTH "STAYBRITE"

(the new super-rustless and super-malleable steel) has a yield point of about 15 tons per square inch and an elongation of 55% to 70%. This exceptional ductility is combined with maximum corrosion-resisting qualities, which it possesses to a remarkable degree. It may be cold-pressed to a degree far in advance of the so-called "Stainless Iron," and, moreover, it presents no difficulties in manipulation, since it can be welded, soldered, brazed and riveted without trouble. Firth "Staybrite" can be supplied as Sheets, Bars, Rods, Plates, Tubes, Sections, Wire Forgings and Castings.

The photograph shows a Chemical Shovel made of Firth "Staybrite," which has been used for two years for dealing with Copper Sulphate Crystals, and has outlasted 24 ordinary blades and 15 wooden handles.

THOS. FIRTH & SONS, LIMITED

SHEFFIELD

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

ASSOCIATED DRUGS AND CHEMICALS, LTD., Union Street, Stratford. (C.C., 16/7/27.) £35 7s. 9d. May 26.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DAVIS (JOHN) AND CO., LTD., Holmfirth, dyers, bleachers, etc. (M., 16/7/27.) Registered July 2, mortgage, to Bank; charged on Ribbleden Dye Works and other properties at Ribbleden, Cartworth; also general charge.

DOBY PRODUCTS, LTD., London, E.C., manufacturers of cleansing materials. (M., 16/7/27.) Registered June 30, £2,000 debenture, to Mrs. E. M. Burbidge, 21, Alexandra Road, Epsom; general charge.

KIRBY (H. AND T.) AND CO., LTD., London, N.W., manufacturing chemists. (M., 16/7/27.) Registered June 29, mortgage, to Bank; charged on Newman House, Belton Road, Willesden. *£5,600. October 16, 1926.

Satisfactions

ALLIANCE (MANCHESTER), LTD., chemical dealers. (M.S., 16/7/27.) Satisfaction registered June 27, all moneys, etc., registered April 26, 1927.

KIRBY (H. AND T.) AND CO., LTD., London, N.W., manufacturing chemists. (M.S., 16/7/27.) Satisfaction registered June 22, £6,000, registered June 22, 1921.

PEARS (A. AND F.), LTD., London, W.C., soap manufacturers. (M.S., 16/7/27.) Satisfaction registered June 28, £35,000, part of amount outstanding July 1, 1908.

London Gazette, &c.

Company Winding Up Voluntarily

STANDARD AMMONIA CO., LTD. (C.W.U.V., 16/7/27.) By special resolutions, June 15, confirmed June 30, M. C. Spencer, 3, Fredericks Place, Old Jewry, London, E.C., appointed as liquidator, and authorised to consent to the registration of a new company with same name.

Partnership Dissolved

LAKELAND PRODUCTS CO. (Herbert HOLLOWAY and Arthur Edward BROADHEAD), colour manufacturers, 117, Eccles New Road, Salford, by mutual consent as from July 1, 1927.

New Companies Registered

COLE AND WILSON, LTD. Registered July 11. Nom. capital, £10,000 in £1 shares. To acquire the business of dyeware and colour merchants and chemical importers carried on at Railway Street, Huddersfield, and elsewhere, as "Cole and Wilson." Power is also taken to carry on the business of cotton and woollen spinners, bleachers, dyers, spinners of and dealers in real and artificial silk, etc. Directors: H. Wilson, 150, Wilmer Road, Heaton, Bradford; Mrs. Ada E. Cole.

E.M.S. INDUSTRIAL PROCESSES, LTD., 14, Waterloo Place, London, S.W.1. Registered July 8. Nom. capital, £20,000 in £1 shares (10,000 7½ per cent. cumulative participating preference and 10,000 ordinary). Objects: To acquire licences or rights in respect of and turn to account processes for the low temperature carbonisation of fuels and bituminous substances; the treatment and distillation of tars, and heavy oils, both mineral and vegetable, and the production of liquid hydrocarbons, etc.

FLINTO, LTD., Archer House, 1a, Archer Street, Notting Hill, London, W. Registered July 8. Nom. capital, £100 in £1 shares. Objects: To acquire the business of manufacturers and vendors of the preparation called "Flinto" now carried on by C. Lucas, W. Barley, R. Liston, and the executors of the late A. Morgan at Archer House, Archer Street, Bayswater, W., as "The Flinto Co.," and to carry on the business of manufacturers of, agents for and dealers in enamels and polishes, paints and varnishes, chemicals, oils, stains, etc.

MONARCH LUBRICATING CO., LTD. Registered July 7. Nom. capital, £500 in £1 shares. Manufacturers, refiners, importers and exporters of and dealers in lubricating oils and greases, soluble oils, resins, soaps, size, disinfectants, oleine, stearine, wool oils, and pitches, etc. Directors: E. Ludham, 39, Nassau Road, Barnes, London, and J. M. Brookes.

Match Companies' Agreement

AFTER prolonged negotiations the directors of Bryant and May announce that they have arrived at a provisional agreement with the Swedish Match Co. with the object of securing the identification of the interests of the two companies in so far as the British Empire, elsewhere than in Asia, is concerned, together with reciprocal arrangements in other parts of the world. The Swedish Match Co. holds or controls the entire share capital of J. John Masters and Co., Ltd., and it also owns or controls match-selling and distributing agencies in Great Britain and Ireland, and in Australia, New Zealand, Canada, and elsewhere within the British Empire. The agreement provides for the formation of a new company to be called "The Imperial Match Co., Ltd.," to acquire the ordinary shares of Bryant and May, Ltd., and the interests, already mentioned, of the Swedish Match Co. and its associated companies. The capital is to be £6,000,000 in shares of £1 each, of which 4,189,548 are to be offered to the existing Ordinary shareholders of Bryant and May in exchange for their present holdings, at the rate of 3¾ new shares for each existing £1 share, while 1,800,000 are to be issued to the Swedish Match Co. in connection with the transfer of its interests, and the balance of 10,452 shares is to be subscribed in cash at par by Bryant and May. The directors and management of Bryant and May, Ltd., will continue as heretofore and the company will preserve its identity, the same applying to J. John Masters and Co., Ltd. The new company (of which Mr. G. W. Payton, of Bryant and May, will be chairman) will thus be in the main a shareholding company.

Benn Brothers' Other Journals

THE CABINET MAKER.—Labour and the Future; "How to Advertise a Retail Furniture Shop," by Gilbert Russell; Furniture Shipments During June; Waring and Gillow's annual general meeting.

THE ELECTRICIAN.—The Paris High Tension Congress; "The 'Change' Circuit," by G. Wilkinson; "Continental Lighting Practice," by C. Sylvester; Costing for Contractors.

THE FRUIT GROWER.—The Fruit Show; Trade Exhibits at "The Royal"; Big Bud and Reversion of Black Currants; National Sweet Pea Society's Show.

GARDENING ILLUSTRATED.—Special Iris Number; Articles by Sir Arthur Hort, Bt., G. P. Baker, George Dillistone and G. L. Pilkington, President of the Iris Society.

THE GAS WORLD.—Meeting of the Association Téchnique de l'Industrie du Gaz en France; Education in the Gas Industry; City and Guilds of London Institute.

THE HARDWARE TRADE JOURNAL.—Electric Novelties for the Summer Trade; Marking Imported Brass Goods: Inquiry continued; Wireless Developments for Retailers.

THE TIMBER TRADES JOURNAL.—Forestry at "The Royal"; The Story of British Honduras; Tooth Speeds of Saw; Scottish Foresters in Belgium.